REPORT UAG - 26

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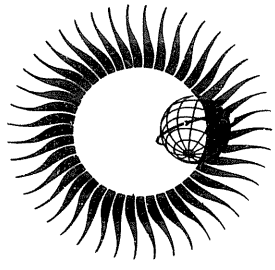
DATA COMPILATION
FOR THE MAGNETOSPHERICALLY QUIET PERIODS
FEBRUARY 19 - 23 AND NOVEMBER 29 - DECEMBER 3, 1970



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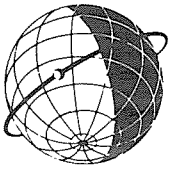

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FEBRUARY 19 - 23 AND NOVEMBER 29 - DECEMBER 3, 1970

compiled by

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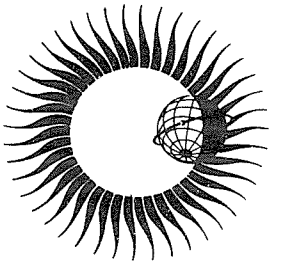

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I. INTRODUCTION

Purpose

Solar-terrestrial scientists often concentrate efforts on unusual phenomena or flare-associated events in efforts to unravel the physical mechanisms operating in the sun's atmosphere, the interplanetary medium or the earth's atmosphere. Another type of effort deals with average or normal conditions. It has not been very fashionable, however, to do case studies of very undisturbed or quiet conditions in solar-terrestrial studies.

Thus, retrospective intervals have usually been chosen to cover periods of unusual solar activity or periods of geomagnetic and other kinds of disturbance. These intervals are sometimes selected by common consent by individual scientists or groups and sometimes endorsed by international bodies such as the International Ursigram and World Days Service, IUWDS, or Inter-Union Commission of Solar-Terrestrial Physics, IUCSTP.

The IUWDS did designate some "quiet" intervals in the early 1960's, but not much special research work resulted, in contrast to the efforts devoted to "disturbed" and "active" intervals. But the idea repeatedly crops up in scientific planning meetings, that scientific progress could, in principle, be made from detailed case studies of quiet periods.

The idea surfaced again in 1972 from J. Roederer (Chairman of the IUCSTP International Magnetospheric Study). In conjunction with A. H. Shapley (Chairman of IUCSTP program for Monitoring of the Sun-Earth Environment (MONSEE)), it was decided to try again to stimulate case study work on quiet solar-terrestrial conditions by selection of one or more intervals but also to give the work an additional stimulus and focus by the assembly of a special data compilation for the selected intervals by one of the World Data Centers.

This is the background for the present data report. The compilation is of the data normally available at the World Data Centers. It is comparable in scope and depth to Report UAG-21 on the very active period in July-August 1972. Depending on the interest the present report generates in the solar-terrestrial community, it may be appropriate later to arrange a detailed data compilation for these quiet periods with contributions from individual scientists as was done in UAG Reports 5, 8, 9, I2, 13 and 24.

Criteria for Selection of Quiet Intervals

Undisturbed solar-terrestrial conditions do not select themselves as active periods do. In selecting the intervals for these case studies, Roederer and Shapley considered many factors:

a) the intervals should be fairly recent so that the data are fresh in peoples' minds, but not so recent that the complex satellite data have not yet been reduced and analyzed.

b) key satellites should have been operating during the intervals so that the potential data availability is maximized. Also, where possible, key complex types of data analysis should be available, such as the AE indices.

c) a decision should be made as to whether the "quiet" criterion applies to solar activity, to the interplanetary medium, to the magnetosphere, to the ionosphere or to other phenomena. In the long run, case studies ought to be made for times when each one of these is quiet while the others may not be. The present selections are times of magnetospheric quiet.

The year 1970 was chosen because it satisfied criteria (a) and (b). Having decided on magnetospheric quiet conditions (criterion (c)), we studied the record of AE, Ap and Kp indices, with particular reliance on daily mean AE. We wanted an interval of several days rather than an isolated single "quietest" day, although it was hoped that the quietest days would be included. We reviewed all the relatively quiet sequences in 1970 and eliminated those where there was prominent substorm activity as shown by the graphs of 2.5-minute AE. Those days having the least apparent substorm activity were selected as "quiet". While some isolated days display no apparent auroral electrojet magnetic variations, such days seldom occur in more than pairs. Groups of three or more quiet days always contained some low-level activity and sometimes contained an obvious weak substorm.

To identify the longest quiet intervals in 1970, the internationally adopted 5 Quiet Days of each month and all additional quiet AE days were listed along with the average daily AE value. Sequences of three or more quiet days in each month were identified and their overall average AE was computed. From April through July, there were no such three day quiet intervals. The longest relatively quiet interval was March 19-26; however, 6 of the 8 days contained identifiable

low-level substorm activity and the average AE was about twice that of other candidate intervals. The two intervals which were both lowest in average AE and contained the most days were: February 19-23 and November 29 - December 3. Both of these five-day intervals included three-day sequences which were the quietest average AE groups of the entire year.

The results discussed above are shown in Table 1 along with other candidate quiet intervals. The dates marked with an asterisk (*) are among the quietest for the entire year. The selection was based not only on the daily mean AE ($\overline{AE}$) of less than 50γ, but also on the 2.5 min daily graphs. The graphs contained no recognizable substorm activity. The three dates marked with a double asterisk (**) have exceptionally low average AE and lowest variances about the average of all days in the year. Only one of these days occurs in our sequence of February 19-23.

The quietest sequence, February 19-23, occurred when the sun was not inactive; in fact, there were numerous active regions and a good number of flares. We decided to select this interval, but also looked for other quiet intervals in 1970 when the sun was not as active. There were several candidates. However, we selected November 29 - December 3 because in addition it had the feature that the interplanetary magnetic field sector containing the earth was apparently of opposite polarity to that for the February interval.

Some Scientific Questions for Case Studies of Magnetospherically Quiet Periods

The following are some of the more obvious general scientific questions, as prepared by Roederer, which study of these two selected quiet periods might answer. Since these are periods of magnetospheric quiet, without any appreciable substorms during several days, some questions are:

1) Was the interplanetary medium very quiet too?

2) If so, why did the observed solar activity not influence it?

3) What happened to the magnetospheric configuration (boundary, plasma sheet, plasmapause, outer radiation belt, etc.) during the quiet period?

4) How do the characteristics of polar cap and open field line characteristics (boundaries) compare in these two cases of opposite interplanetary field polarity?

General Record of Solar-Terrestrial Activity in 1970

We present on the following pages the tabular and graphical records of various solar-terrestrial parameters and indices for the whole of 1970 in order to put into perspective the relative activity and quiet of the two selected intervals. These are data taken from the usual sources, mostly from *Solar-Geophysical Data*. The selected intervals are specially identified in the graphs and tables.

1) Figure 1: 3-hourly Kp indices

2) Figure 2a and Table 2: Daily average $\overline{AE}$ indices (from Report UAG-22)

3) Figure 2b and Table 3: Daily Ap indices

4) Figure 3a and Table 4: Daily values of 10 cm solar flux (Ottawa)

5) Figure 3b and Table 5: Daily Zürich relative sunspot number R_Z

The graphs indicate quiet $\overline{AE}$ and Ap and relatively quiet Kp values for the selected intervals February 19-23 and November 29 - December 3, 1970. However, the 10 cm solar flux (2800 MHz) and the relative sunspot numbers R_Z for these periods are noticeably high.

Acknowledgements

We acknowledge the following sources of data for this compilation in addition to the data in World Data Center A for Solar-Terrestrial Physics:

Geophysics and Space Data Bulletin, Vol. VII, No. 1, First Quarter 1970 (Complex Radio Burst on 21 February 1970, Sagamore Hill Observatory).

IAU Quarterly Bulletin on Solar Activity, October/December 1970, No. 172 (November and December Nançay Interferometric Observations).

Kiruna Geophysical Data - Data Summary 70/1-3, 70/10-12 (Riometer Data and Magnetograms for February 19-23 and November 29 - December 3, 1970).

"Hourly Values of Equatorial Dst for the Years 1957 to 1970" by M. Sugiura and D. J. Poros, July 1971, Goddard Space Flight Center, X-645-71-278 (data for February and November-December, 1970).

Table 1

MONTH 1970	INTERNAT'L 5 QUIET DAYS in mo.	DAILY $\overline{AE}$ γ	OTHER QUIET AE DAYS in month	DAILY $\overline{AE}$ γ	SEQUENCES OF QUIET AE DAYS (3 or more days in month)	INTERVAL AVERAGE $\overline{AE}$ γ
January	4	67	10	60	None	
	11	64	22	66		
	13	72	28	61		
	25*	40				
	26*	41				
February	7**	20	6	52	6 - 9	43
	8	47	9	52		
	11	42	12**	27	11 - 13	39
	21*	32	13	49		
	22*	36	19	54	19 - 23	40
			20	50		
			23**	26		
			25	38		
March	16	56	11	69	19 - 26	72
	21	89	14	44		
	22	57	17	89		
	24*	46	19	88		
	25	53	20	83		
			23	76		
			26	83		
April	10	73	1	62	None	
	13	69	2	86		
	14	58				
	15	160				
	28	154				
May	8	111	7	89	None	
	9	111	18	86		
	10	73				
	11	81				
	26	81				
June	6	72	None		None	
	11	114				
	12	145				
	22	112				
	23	80				
July	7	121	None		None	
	15	131				
	18	107				
	19	167				
	28	71				
August	1	108	None		3 - 5	75
	3	61				
	4	95				
	5	69				
	24	95				
September	6	111	28	80	28 - 30	74
	9	150	30	84		
	11*	41				
	12	98				
	29	59				
October	7	49	27	68	7 - 9	46
	8*	43	31	68		
	9*	48				
	15	88				
	21*	46				
November	1*	39	17	76	29 - 30 --- (see below)	
	15	60				
	20*	25				
	29*	39				
	30*	34				
December	1*	25	2	57	1 - 3 (Nov 29-Dec 3)	46
	10	90	3	76		
	11*	35	13	69		
	17	75	16	71	16 - 18	64
	31*	25	18	47		
			25	71		
			26	74		

* quietest AE days of entire year.
** days with exceptionally low average AE and with lowest variance about the average.

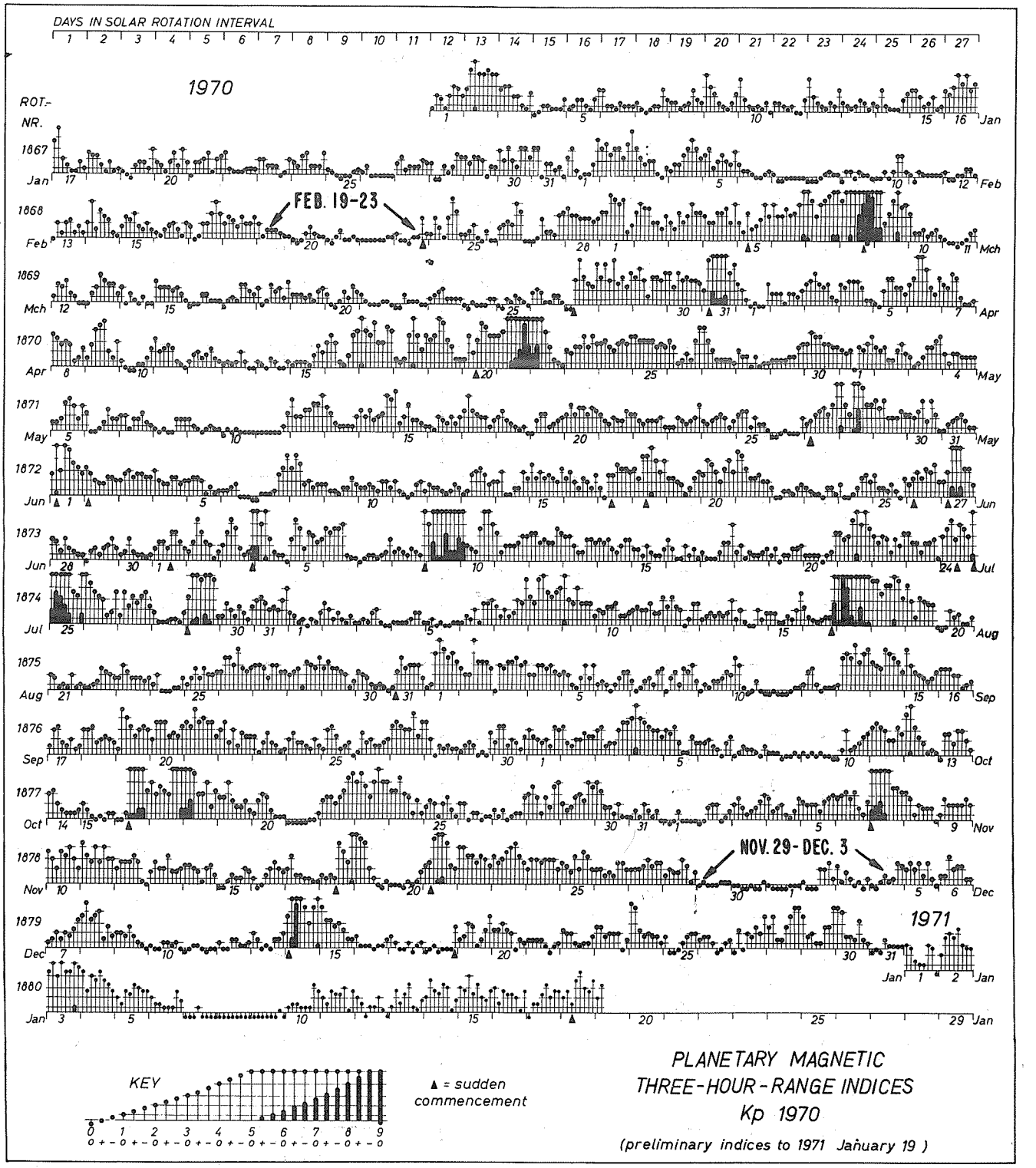


Fig. 1. Three-hour Kp indices in graphical form for the year 1970. The selected magnetospherically quiet periods are indicated by arrows.

Table 2
DAILY AVERAGE INDICES AE

1970

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	120	83	321	62	203	393	212	108	349	169	39	25
2	403	271	227	86	160	183	172	121	225	152	88	57
3	135	75	194	190	177	335	355	61	272	211	189	76
4	67	202	402	122	133	256	258	95	153	303	133	96
5	88	145	223	120	202	146	237	69	171	133	167	154
6	76	52	369	328	104	72	277	117	111	108	322	209
7	109	20	490	120	89	170	121	172	95	49	606	191
8	86	47	822	160	111	242	389	336	196	43	162	329
9	134	54	396	223	111	134	652	274	150	48	195	96
10	60	108	121	73	73	183	292	157	112	198	265	90
11	64	42	69	172	81	114	253	194	41	404	284	35
12	130	27	133	144	349	145	306	243	98	233	186	97
13	72	49	146	69	172	310	229	214	432	154	236	69
14	76	150	44	58	325	160	177	100	375	151	144	416
15	70	133	124	160	185	363	131	145	214	88	60	255
16	467	92	56	270	187	175	164	269	174	338	96	71
17	194	159	89	381	190	254	182	718	181	530	76	75
18	85	137	132	299	86	528	107	562	198	280	178	47
19	91	54	88	345	207	236	167	248	382	261	151	116
20	139	50	83	280	344	673	167	105	294	203	25	186
21	100	32	89	630	256	413	386	118	407	46	462	104
22	66	36	57	328	248	112	291	187	216	399	387	130
23	82	26	76	391	183	80	191	194	187	398	464	98
24	154	141	46	388	171	127	361	95	173	215	142	156
25	40	38	53	344	265	218	597	319	155	138	181	71
26	41	236	83	264	81	365	370	458	115	99	122	74
27	112	167	177	195	400	363	280	324	375	68	177	179
28	61	274	413	154	445	212	71	220	80	191	112	324
29	71		334	246	247	206	553	216	59	216	39	159
30	158		254	351	239	141	162	134	84	107	34	143
31	95		396		159		429	287		68		25
Mean	118	104	210	232	200	244	275	221	202	194	191	134

Table 3
DAILY AVERAGE INDICES Ap

1970

DAY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	8	9	22	6	11	28	10	4	23	10	2	1
2	30	20	16	6	9	9	11	6	18	9	4	4
3	9	7	15	11	10	11	24	4	15	14	8	4
4	3	12	16	10	6	8	26	4	11	25	7	5
5	6	10	12	9	12	6	16	3	8	9	9	8
6	5	4	25	23	6	3	15	8	5	6	12	8
7	5	2	42	10	6	9	5	12	6	4	58	8
8	6	2	149	12	4	13	10	26	8	2	8	19
9	10	3	47	18	4	5	87	19	5	2	8	6
10	6	5	7	3	2	6	34	7	6	7	17	3
11	4	3	3	8	3	4	10	9	1	15	20	2
12	8	3	6	6	15	5	14	9	5	16	10	4
13	4	5	8	4	6	10	10	6	24	9	9	4
14	6	11	3	3	13	8	9	4	19	8	7	65
15	7	8	7	5	10	13	5	7	11	4	4	14
16	17	5	3	14	6	9	6	21	8	37	5	4
17	11	10	5	29	10	13	8	115	8	34	6	3
18	6	9	6	18	5	27	5	36	10	39	18	3
19	5	4	5	21	6	8	5	14	18	11	18	10
20	7	3	4	21	13	18	6	4	15	7	3	8
21	6	2	3	90	8	17	30	5	23	1	30	4
22	5	2	2	41	6	4	12	6	12	18	18	6
23	5	4	5	14	7	4	9	7	6	29	21	7
24	7	11	2	16	6	6	26	4	6	14	12	14
25	2	4	3	17	7	6	92	8	8	6	13	4
26	2	10	5	13	2	13	21	17	6	4	8	4
27	6	8	16	10	15	35	14	12	19	5	10	8
28	5	14	21	5	45	7	4	12	7	15	8	18
29	6		17	7	13	6	45	10	5	13	2	12
30	12		16	18	11	5	7	5	9	9	1	13
31	8		51		6		14	12		4		2
Mean	7	7	17	16	9	10	19	13	11	12	12	9

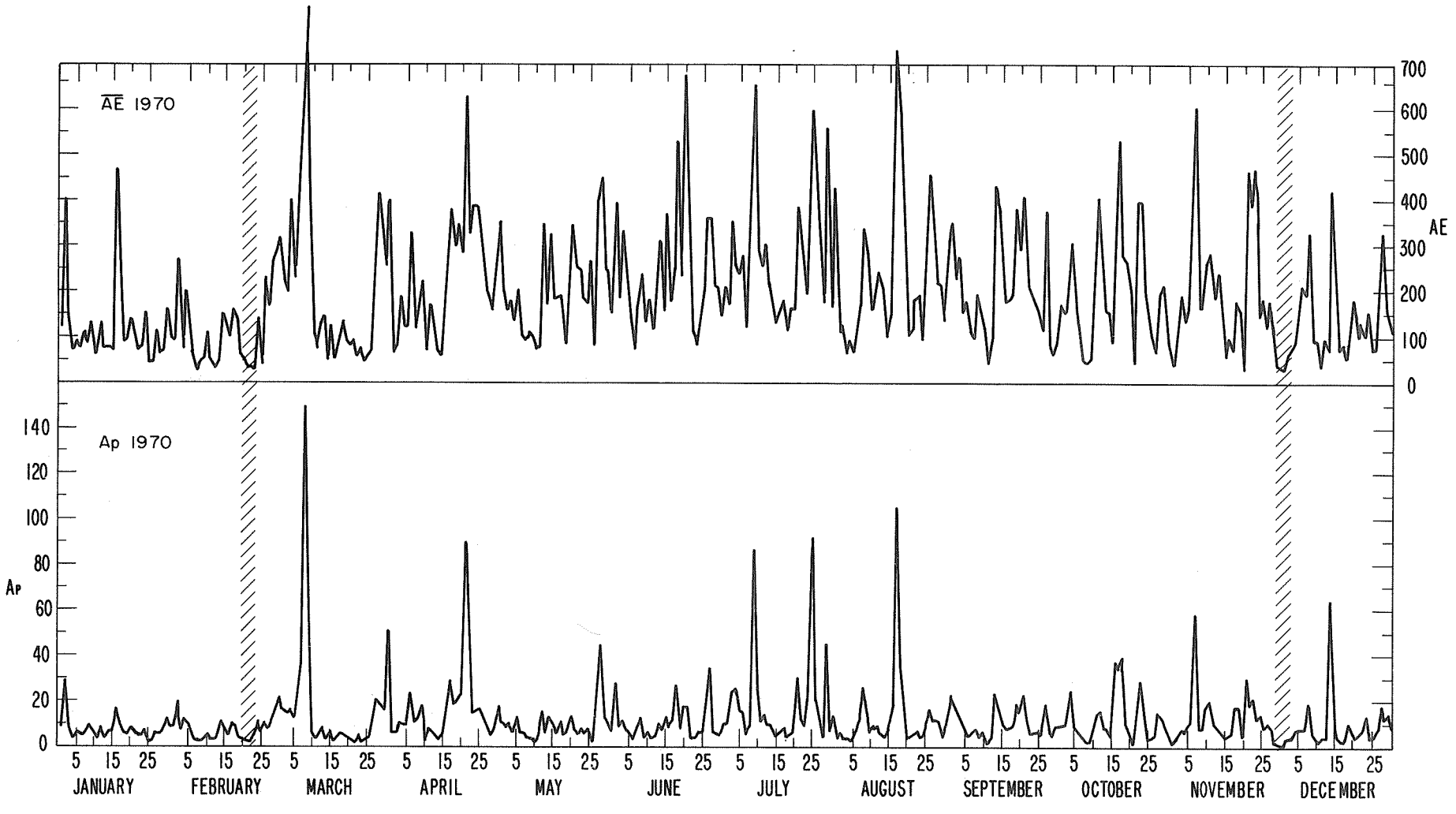


Fig. 2a and 2b. Graphical display of daily mean values of $\overline{AE}$ and daily Ap indices for the year 1970. The selected magnetospherically quiet periods are indicated by ///.

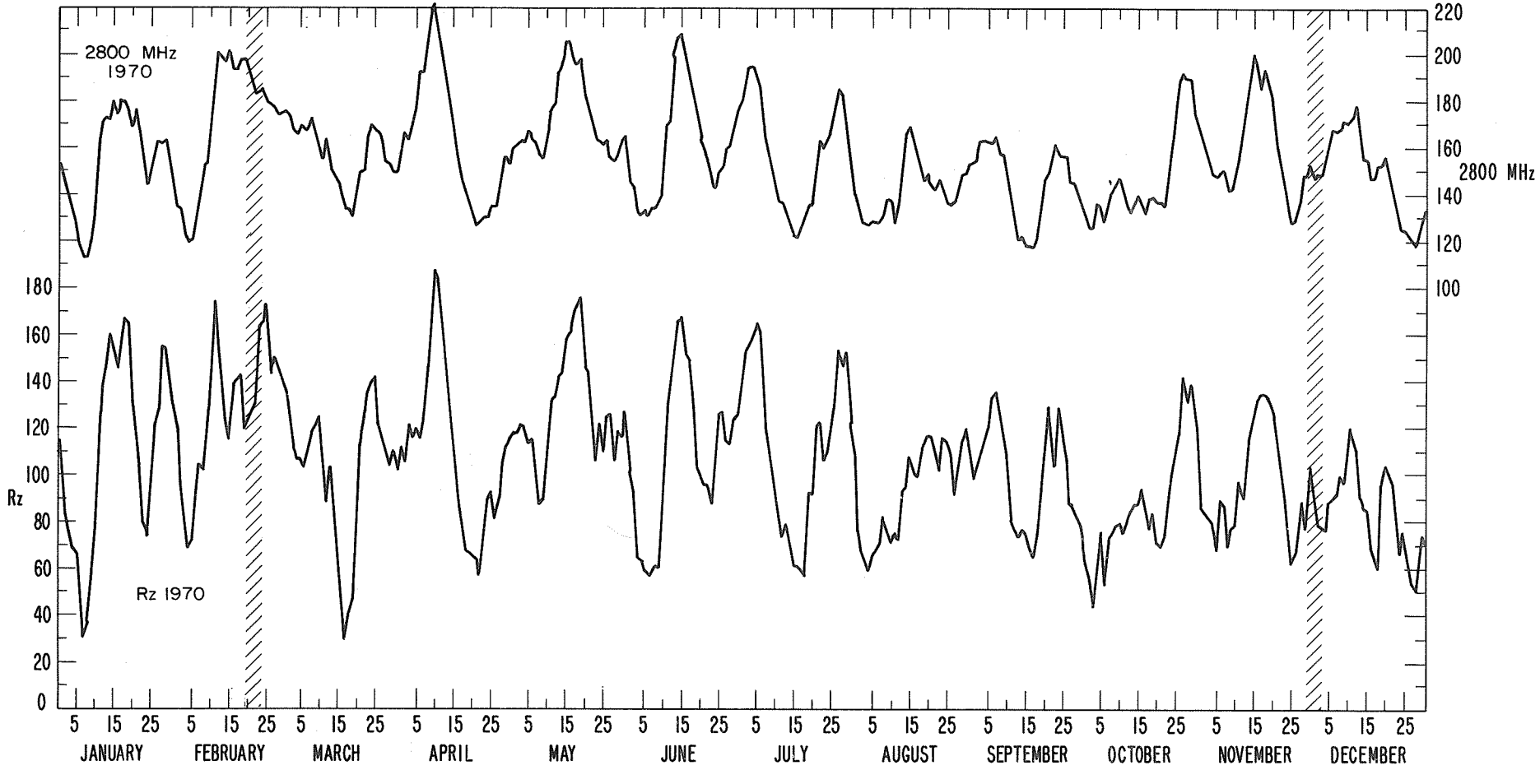


Fig. 3a and 3b. Graphical display of solar indices 2800 MHz and relative Zurich sunspot numbers Rz for the year 1970. The selected magnetospherically quiet periods are indicated by ///.

Table 4

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

1970

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	150.9	134.6	175.7*	160.8*	159.5	145.6	179.9	134.0*	154.1	128.7	163.3	146.4
2	144.5	133.1	173.0	167.1	160.7*	141.8	189.0*	128.5	156.7	125.4	159.1	148.4*
3	137.1	123.7	167.3	163.5	163.5	133.4	194.6*	127.9	163.2*	126.0	153.2*	148.1
4	131.5	119.4*	165.3	170.4	162.3	131.7	195.0	127.4	163.4*	137.3	148.3	154.0
5	126.5	121.0	169.8	179.4*	167.9	132.9*	191.0	128.4	162.3*	134.5	147.5	161.9*
6	117.6	131.9	167.8	192.9	163.3	130.0	186.4	128.0	161.5	128.0*	149.8	167.5
7	113.0	139.4	168.4*	193.4*	162.4	134.5*	166.3	128.2	164.4	133.3	150.6	166.5*
8	113.3	152.6	172.8*	203.1*	156.7	134.2	160.4	131.8	156.9	142.0	141.1	167.3
9	119.6	154.1	164.4	218.5	154.9*	138.2	148.4	138.3	157.2	144.9*	141.9	171.5
10	134.5*	170.3*	158.3	224.7*	162.8	145.9	143.8	137.3	143.9	147.6	147.8	170.9
11	160.1	184.3*	156.3*	206.4	176.2	169.5	137.7	127.2	134.4	142.8	155.6	172.6*
12	171.6	201.0	164.4	198.5*	180.3	171.7	135.4	136.9*	126.1	135.4	165.1*	178.4*
13	172.9	197.6	152.4*	185.3	193.1	200.3*	130.7	149.7	120.1	131.8*	179.1	164.3
14	171.8*	196.2	147.3	173.8*	196.8	207.4*	126.3	167.0*	121.9	134.9*	186.4*	154.6
15	180.0*	201.6	144.9	163.6	206.3	209.2	121.9	169.1	118.0	140.2*	200.0	154.1
16	174.3*	193.3	139.0	152.2	206.0	198.6	121.4	162.5	118.4	134.0	193.5	146.7
17	180.6	193.9	133.7	148.0	197.0	190.6	125.9	151.6*	116.9	131.5	184.1*	146.8
18	179.4*	197.7	133.5	141.9	194.6	181.8	131.0	149.0	120.7	138.5	193.1*	151.6*
19	175.3	198.5	130.2	135.7	197.4	175.1*	135.8	145.4	134.7*	139.0	185.5*	152.4*
20	168.4*	196.5	141.1	131.2	183.9	163.3	136.4	148.6	146.9	137.2	173.7	155.6
21	177.0	191.1*	149.7	126.3	174.9	160.6	150.6*	142.8	149.4	136.5	163.3*	146.3*
22	160.5	183.0*	150.9*	128.6	170.3	150.1*	163.8	141.7	155.2	135.0	154.2	136.8*
23	153.4	183.9	164.9*	130.1	163.7	143.7	158.7*	146.2	161.6	149.0	142.4	132.1
24	143.6	185.9	169.8*	130.1	162.6*	142.3	164.0	140.2	156.0*	161.2*	133.9	124.4
25	149.5	179.6*	167.2	134.8	160.6	149.3	169.0	136.5	155.8	168.6*	127.9	124.0
26	156.4	178.3*	166.4*	135.3	162.8	151.4	176.3	135.7	155.9	187.1	129.3	122.3
27	163.0	176.9	159.2	138.0	155.2	160.0	185.9	137.2*	145.0	191.8	135.1	119.8
28	162.0*	174.1	153.8	148.6	153.8	160.5	182.1	141.6	144.5*	190.3	148.9	117.3
29	163.3*		153.1	156.1	158.5	168.0*	161.0	148.7	138.7	189.0	148.4	123.4
30	154.8*		149.4	153.3	163.7	174.8	156.1	149.0	134.7	175.2	152.5	129.0*
31	143.4*		149.3		165.2		141.5	154.5		168.6		133.3
MEAN	153.2	171.2	156.8	163.1	172.2	159.9	157.0	141.6	144.6	147.3	158.5	148.0

* adjusted for burst

Table 5

RELATIVE SUNSPOT NUMBERS

ZURICH, R_Z

1970 FINAL

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	115	121	137	112	118	102	137	77	98	63	86	91
2	83	96	129	105	118	92	153	68	104	57	82	78
3	78	82	113	121	122	64	155	64	110	43	80	78
4	69	68	107	116	119	63	159	59	115	55	78	76
5	66	72	107	120	113	59	165	65	120	75	67	88
6	57	93	103	115	115	57	161	68	133	53	89	90
7	30	104	111	123	98	58	125	72	136	72	86	91
8	37	102	118	147	87	61	115	82	125	76	69	100
9	59	123	120	172	90	60	104	76	116	78	77	96
10	84	133	125	188	111	92	90	71	103	79	78	110
11	106	175	103	183	132	122	81	75	82	75	97	120
12	138	153	88	163	134	138	74	73	76	80	89	110
13	145	145	104	141	142	153	79	92	73	84	105	90
14	160	124	84	124	145	165	68	94	76	87	117	85
15	155	115	65	106	159	168	61	108	75	87	125	84
16	145	139	48	92	161	153	61	100	68	94	133	68
17	160	142	29	82	169	148	59	99	65	84	135	63
18	168	143	41	68	173	134	56	108	75	76	135	79
19	165	120	48	67	176	105	92	113	98	83	132	95
20	133	125	93	65	146	99	92	117	114	70	128	104
21	118	128	115	64	143	96	120	117	129	69	119	101
22	104	132	122	57	125	96	122	108	109	73	105	97
23	79	164	135	67	106	87	106	101	104	89	96	85
24	73	166	140	90	122	102	110	116	129	100	77	66
25	98	173	142	93	110	126	122	114	114	111	62	75
26	123	143	122	81	125	127	138	109	107	117	65	64
27	130	150	115	88	126	114	153	91	87	142	74	53
28	156	146	110	106	106	113	146	101	85	131	89	50
29	154		103	112	118	124	153	114	81	139	78	59
30	138		111	116	116	127	122	120	77	126	103	74
31	131		101		127		108	111		117		68
MEAN	111.5	127.8	102.9	109.5	127.5	106.8	112.5	93.0	99.5	86.6	95.2	83.5

1970 yearly mean = 104.5

II. FEBRUARY 19-23, 1970 PERIOD

Brief Synopsis of Solar Activity

Eleven regions passed the Central Meridian during the period February 19-23, 1970, including two in the Great Activity category; a total of 20 regions were visible on the solar disk. Thirteen confirmed flares of importance ≥1F occurred:

	Imp.	Location	Start Time UT
February 19	1B	S18 E48	0323
	1F	S13 W31	0800
	1N	S14 W29	1201
	1F	S20 E37	2307
February 20	2B	S19 E32	0945
February 21	1N	S20 E18	0933
	1F	S12 E11	1423
	1N	S27 E07	2134
February 22	1N	S28 E05	0319
	1N	S23 W39	1136
	1B	N14 E57	1423
February 23	1B	N17 E53	0207
	1N	N23 E13	2244

The Abbreviated Calendar Record on page 10 gives a concise but comprehensive solar-geophysical activity synopsis. The format is explained in *Solar-Geophysical Data* Descriptive Text, Number 342 (Supplement), February 1973 issue.

Most of the data published in this report are from *Solar-Geophysical Data*. The explanation of those data is found in *Solar-Geophysical Data* Descriptive Text, Numbers 306, 318, 330 and 342 (Supplement) covering the years 1970, 1971, 1972 and 1973, respectively.

DAILY SOLAR INDICES

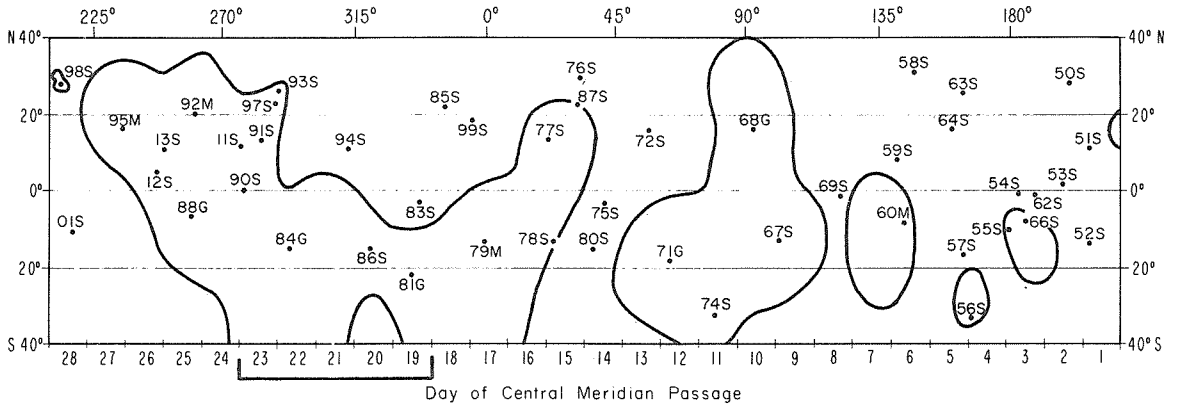
FEBRUARY 1970

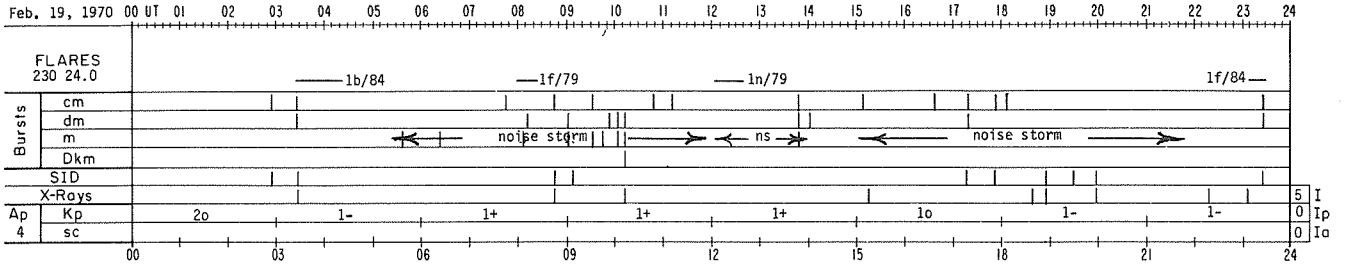
FEB. 1970	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.							
			R_Z	$R_{A'}$	OTTAWA 2800	AFCRL 15400	AFCRL 8800	AFCRL 4995	OTTAWA 2800	AFCRL 2695	AFCRL 1415	AFCRL 606	AFCRL 245
16	47	4	139	141	198.1	560	326	288	193.3	187.7	137.2	79.9	15.6
17	48	5	142	146	198.7	567	336	305	193.9	195.1	134.6	78.3	15.3
18	49	6	143	155	202.4	561	325	286	197.7	186.3	133.7	76.7	14.0
19	50	7	120	136	203.2	564	326	292	198.5	192.0	133.8	83.9	28.2
20	51	8	125	153	200.9	557	320	281	196.5	189.0	133.3	80.7	28.3
21	52	9	128	163	195.4*	561	329	284	191.1*	199.8	137.8	78.4	
22	53	10	125	161	187.1*	557	319	272	183.0*	179.7	144.1	79.1	13.5
23	54	11	164	181	187.8	556	324	279	183.9	185.0	133.7	76.8	11.9
24	55	12	166	177	189.9	559	326	277	185.9	182.7	134.5	75.8	11.4
25	56	13	173	164	183.3*	542	329	271	179.6*	175.6	131.3	72.7	12.1
26	57	14	143	145	181.9*	556	321	278	178.3*	178.0	132.9	69.8	11.8
27	58	15	150	151	180.3	556	305	270	176.9	169.1	126.0	68.7	16.8
28	59	16	146	118	177.5	556	306	266	174.1	167.1	131.3	63.8	13.8
Monthly Mean			129.8	132.2	175.4	554	312	264	171.2	166.4	121.9	72.2	14.7

* Adjusted for Burst

ABBREVIATED CALENDAR RECORD

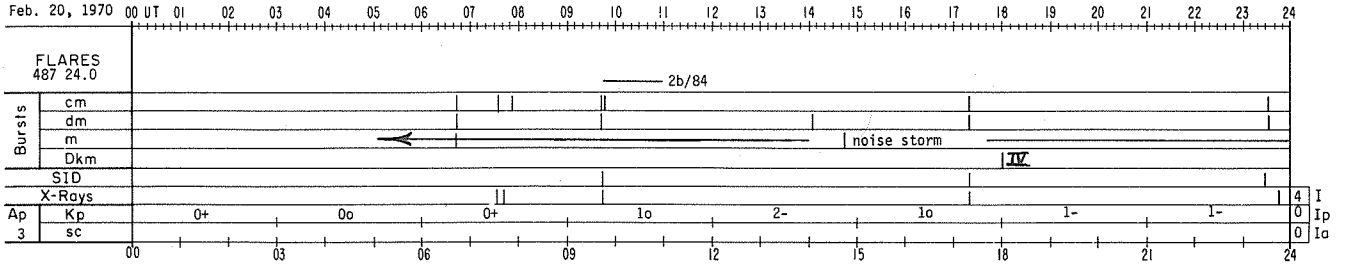
FEBRUARY 1970





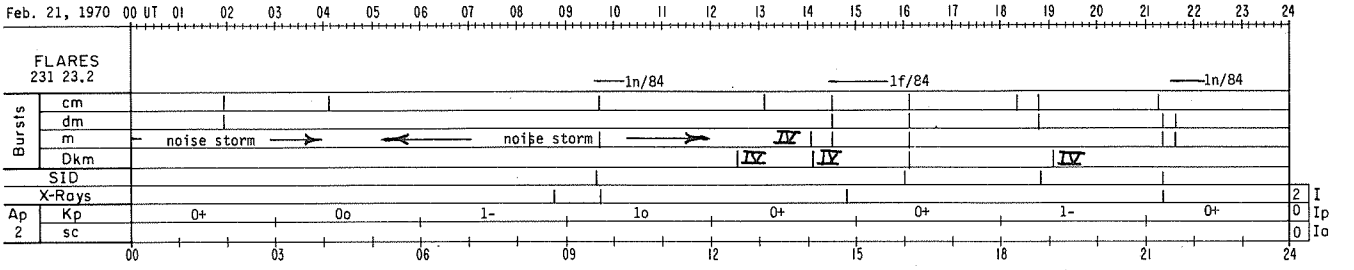
203 10 cm flux
120 Rz
CMP 10583 S03 (2)
10581 S22 17734 S22 (βp)5
(17748) S16 (β)1

Very br. green corona 7 days earlier on SE limb, no coronal data 7 days later on W. limb.



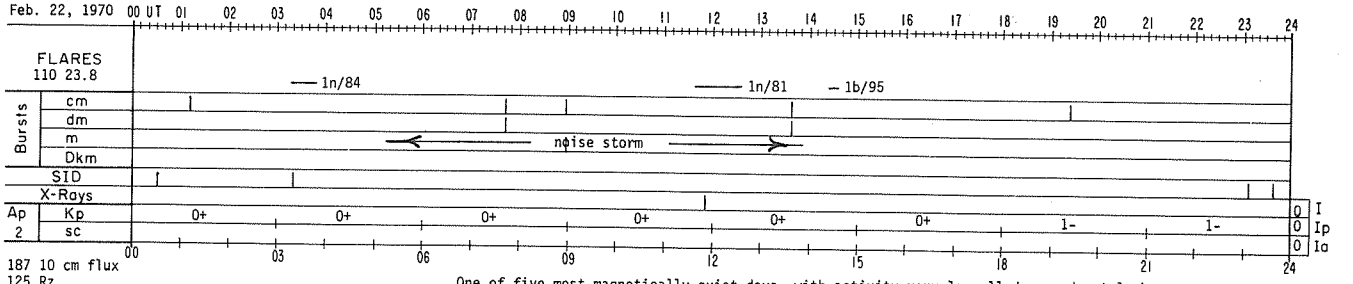
201 10 cm flux
125 Rz
CMP (10586) S15 (4)

One of ten most magnetically quiet days with activity very low 0000-0900; moderately br. green corona 7 days earlier on SE limb, no coronal data 7 days later on W. limb.



195 10 cm flux
128 Rz
CMP 10594 N11 17754 N11 (βf)3

One of five most magnetically quiet days with activity very low all day; no coronal data 7 days earlier on E. limb, moderately br. green corona 7 days later on SW limb.

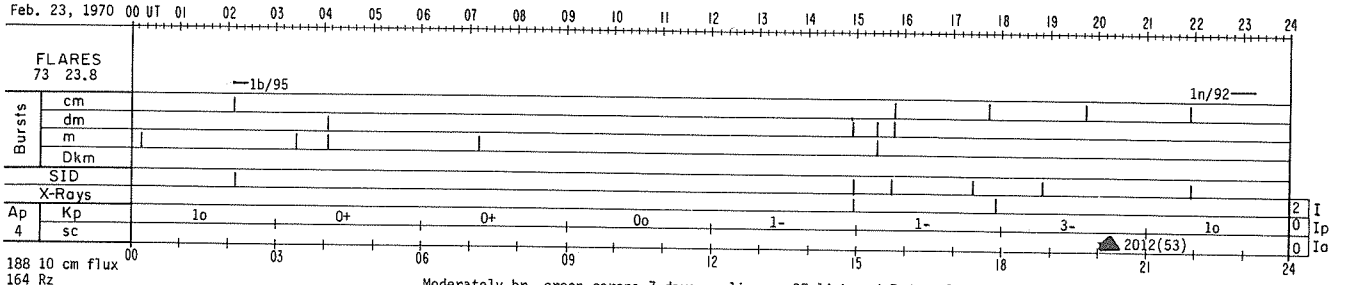


187 10 cm flux
125 Rz
CMP 10584 S15 (4)

17743 S14 (βp)6 (CMP Feb. 21)
17744 S21 (β)2 (CMP Feb. 23)
17745 S18 (βp)4
(17755) S17 (β)2
(17757) S10
17761 S25 (αp)1 (CMP Feb. 23)

10593 N26

One of five most magnetically quiet days, with activity very low all day; moderately br. green corona 7 days earlier on SE limb and 7 days later on NW and SW limb.



188 10 cm flux
164 Rz
CMP (10596) N54
10597 N23 17758 N21 (βp)2 (CMP Feb. 22)
10591 N14
10590 N00 17752 N01 (βp)2
(10611) N12

Moderately br. green corona 7 days earlier on SE limb and 7 days later on NW and SW limb.

FEBRUARY 19, 1970 (P=-18.63, B_o=-6.99, L_o=341.98)

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X-RAY
OSO-5

NP

NO DATA

E W

SP

Intensities in Units
of 10^{-6} ergs cm^{-2} sec^{-1}

ESSA-BOULDER

SUNSPOTS

NP

590
588B
588A
584A
584B
584C
581
587
579

E W

SP

1530 UT

CORONA
NO DATA

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 20.3
DELTAX = 15.0

NP

E W

SP

18.09-19.31 UT

Levels
±5
±10
±20
±40
±80

12

STANFORD

9.1 cm

NP

E W

SP

20-21 UT

Brightness Unit 5,000° K

FLEURS, AUSTRALIA

21 cm

N

NO DATA

S

02-03 UT

Resolution 3 Minutes of Arc
Brightness Unit 1,700° K

McMATH-HULBERT

CALCIUM REPORT

NP

592
593
591
590
588
585
583
584
581
579
576
587
577
572
575
578
580
571

W E W

SP

1350 UT

POOR	B
77-14	2.5
79-38	3.5
81-61	3.0
83-05	2.5
84-81	3.0
87-11	3.0
88-35	3.5
90-22	3.0
92-07	2.5

FEBRUARY 20, 1970 (P=-18.95, B_o=-7.02, L_o=328.81)

13

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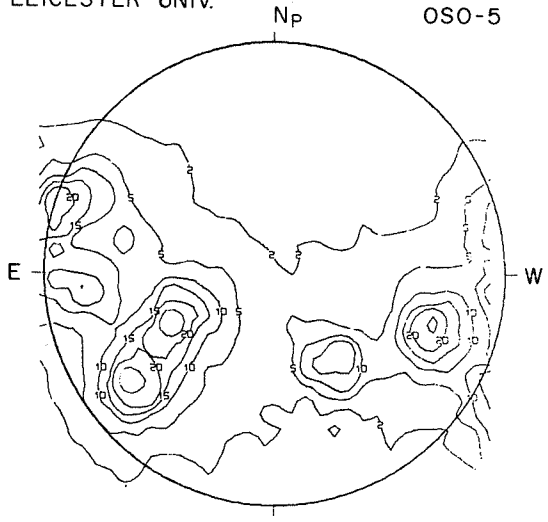
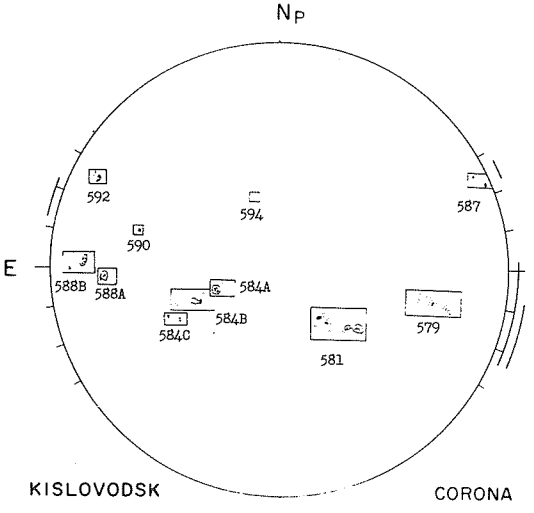
X-RAY
OSO-5



1635-1818 UT

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

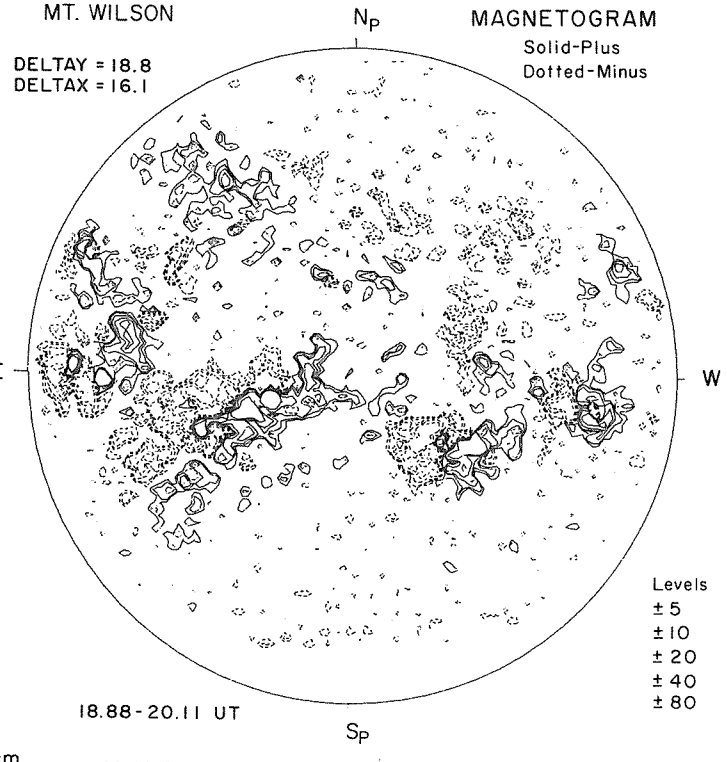
ESSA-BOUDLER
SUNSPOTS



KISLOVODSK
CORONA

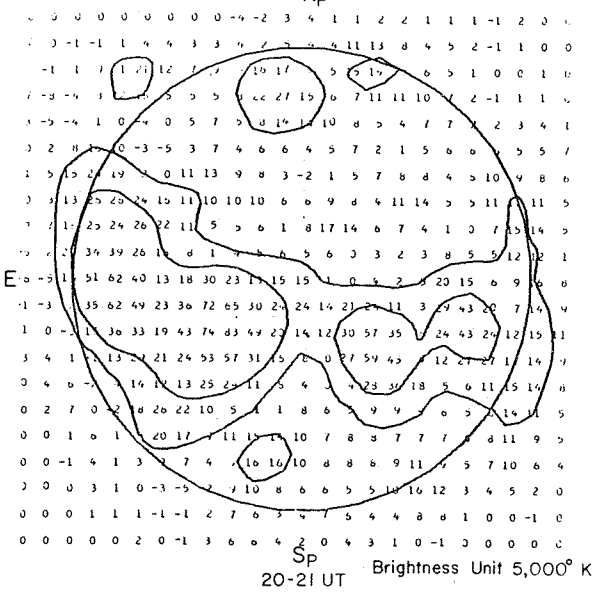
1455 UT

MT. WILSON
MAGNETOGRAM
Solid-Plus
Dotted-Minus



18.88-20.11 UT

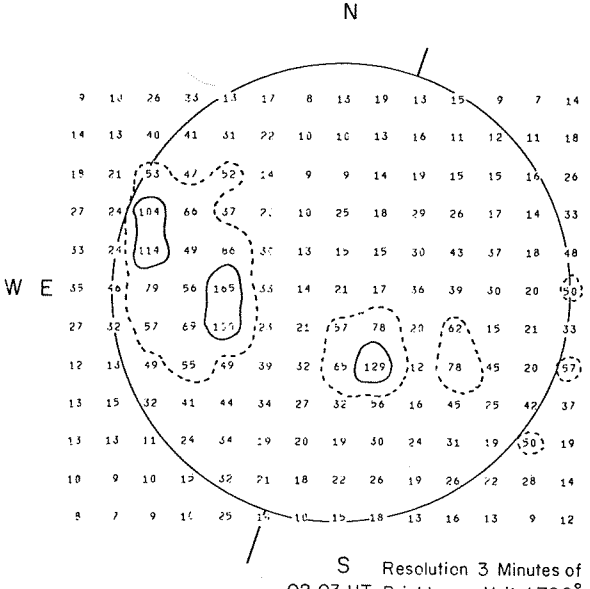
STANFORD
9.1 cm



20-21 UT

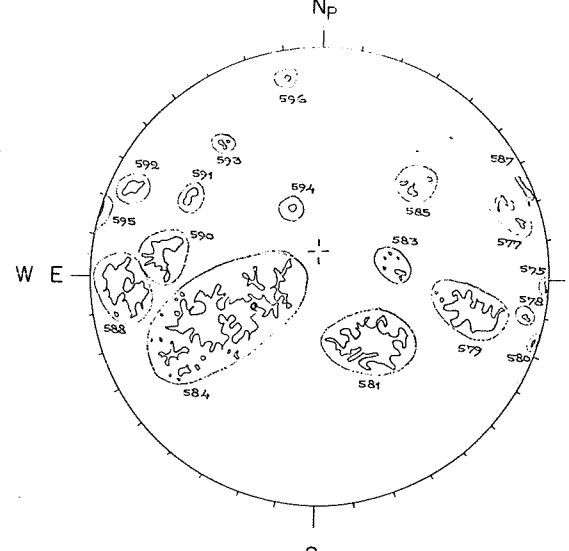
Brightness Unit 5,000° K

FLEURS, AUSTRALIA
21 cm



Resolution 3 Minutes of Arc
02-03 UT Brightness Unit 1,700° K

McMATH-HULBERT
CALCIUM REPORT



1430 UT

FAIR	M
79	39 - 3.5
81	58 - 3.5
84	88 - 3.5
87	12 - 2.5
88	55 - 3.5
90	25 - 3.0
92	10 - 3.5

FEBRUARY 21, 1970 (P=-19.25, B_o=-7.05, L_o=315.64)

14

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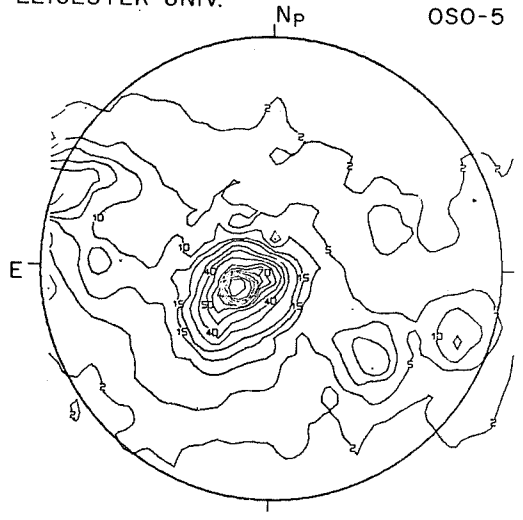
X-RAY
OSO-5

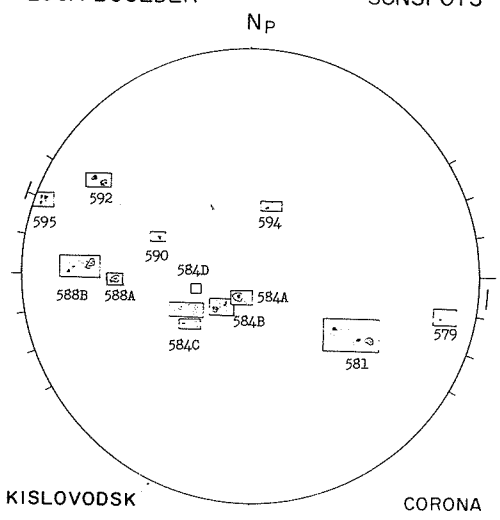


1452-1537 UT

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

ESSA-BOULDER

SUNSPOTS



KISLOVODSK

CORONA

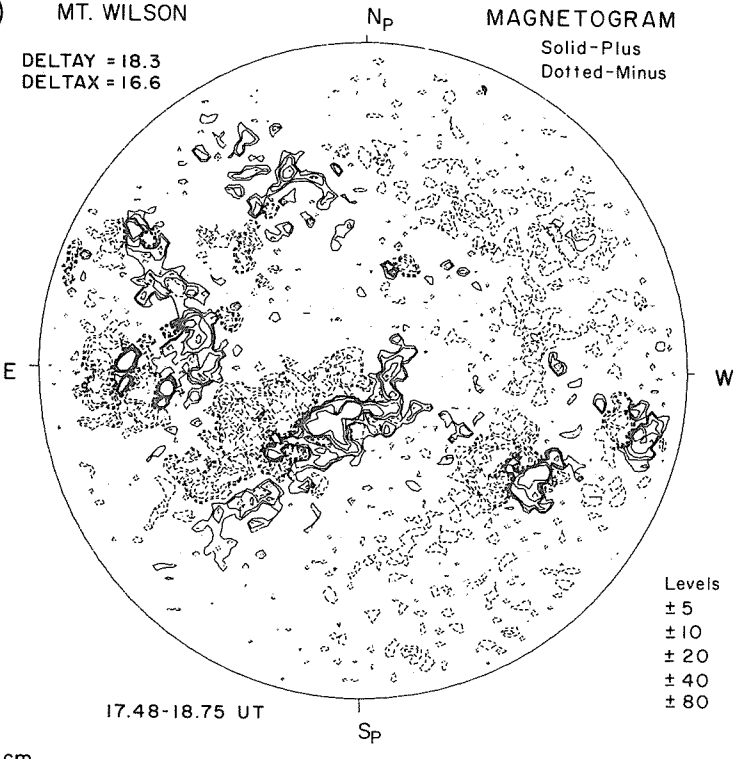
1520 UT

MT. WILSON

MAGNETOGRAM

Solid-Plus
Dotted-Minus

DELTAY = 18.3
DELTAX = 16.6

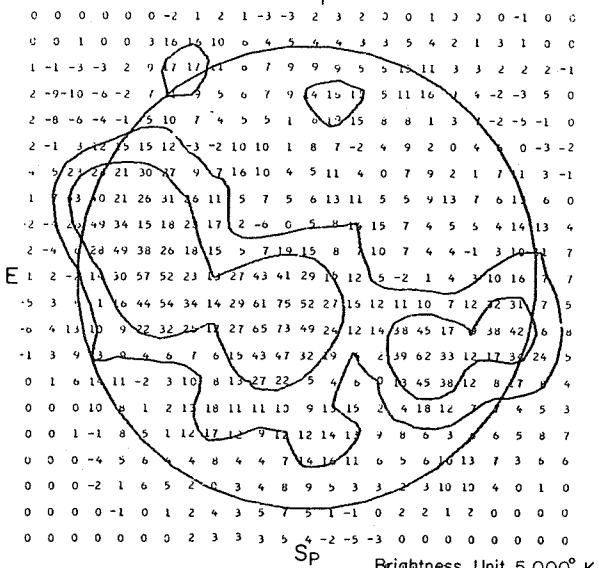


Levels
±5
±10
±20
±40
±80

17.48-18.75 UT

STANFORD

9.1 cm

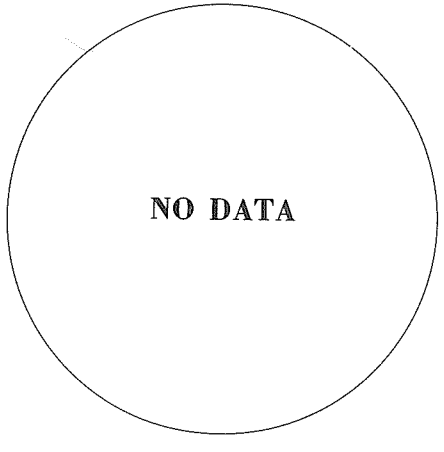


20-21 UT

Brightness Unit 5,000° K

FLEURS, AUSTRALIA

21 cm

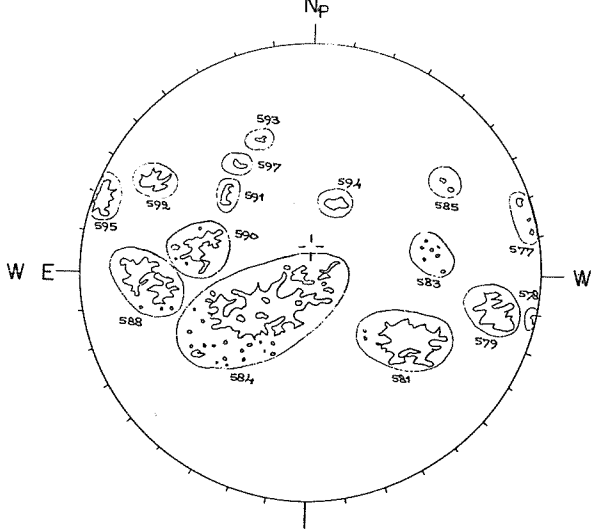


Resolution 3 Minutes of Arc

02-03 UT Brightness Unit 1,700° K

McMATH-HULBERT

CALCIUM REPORT



POOR	M
79-40-3.0	
81-60-3.0	
84-90-3.5	
88-51-3.0	
90-28-2.5	
92-18-3.5	
94-05-3.0	
95-30-3.5	

1545 UT

FEBRUARY 22, 1970 (P=-19.55, B_o=-7.08, L_o=302.47)

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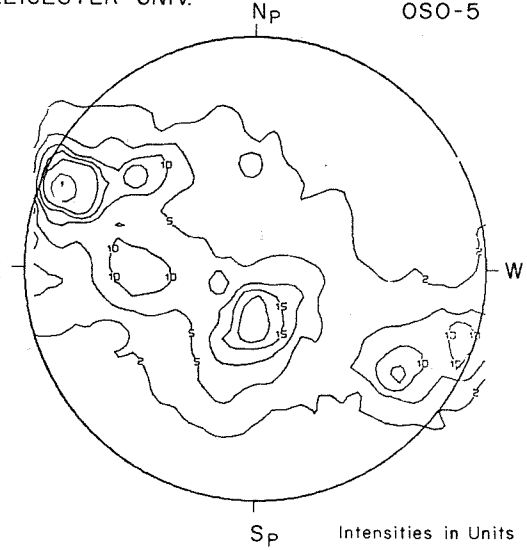
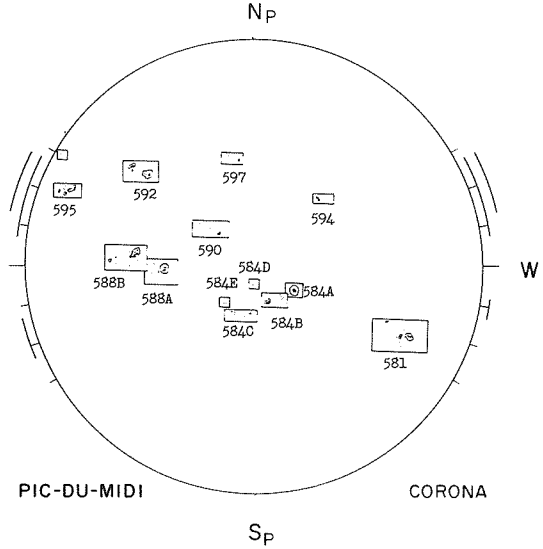


1625-1803 UT

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

ESSA-BOULDER
SUNSPOTS

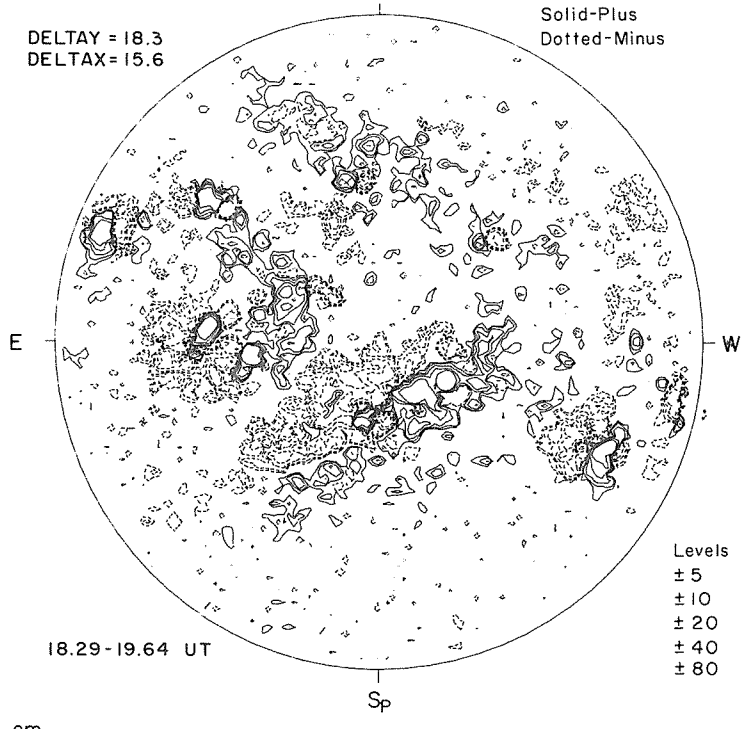


1600 UT

PIC-DU-MIDI
CORONA

MT. WILSON
MAGNETOGRAM
Solid-Plus
Dotted-Minus

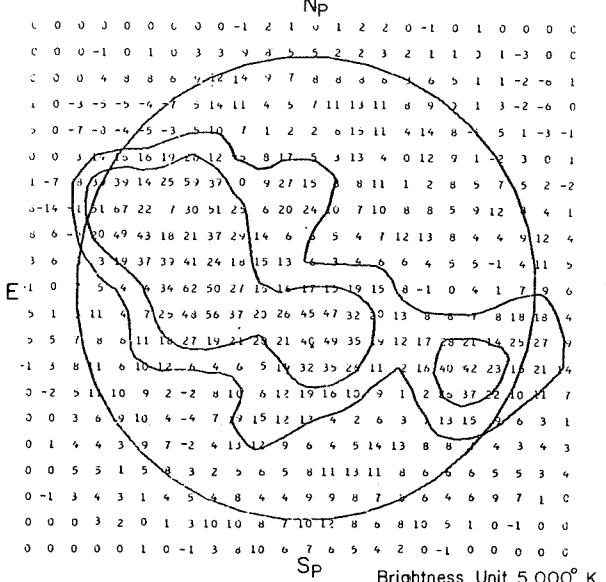
DELTAY = 18.3
DELTAX = 15.6



18.29-19.64 UT

Levels
±5
±10
±20
±40
±80

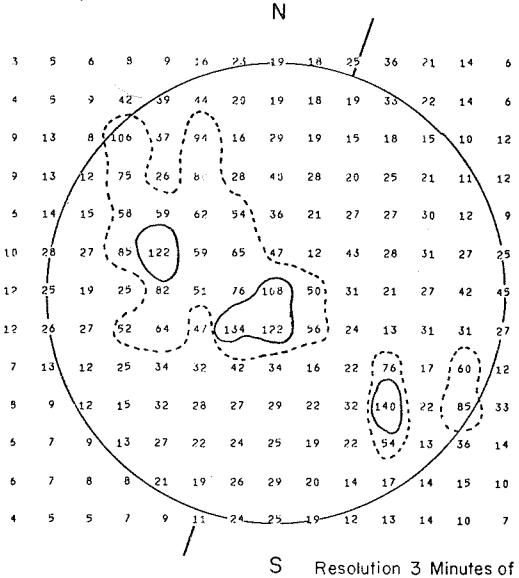
STANFORD
9.1 cm



20-21 UT

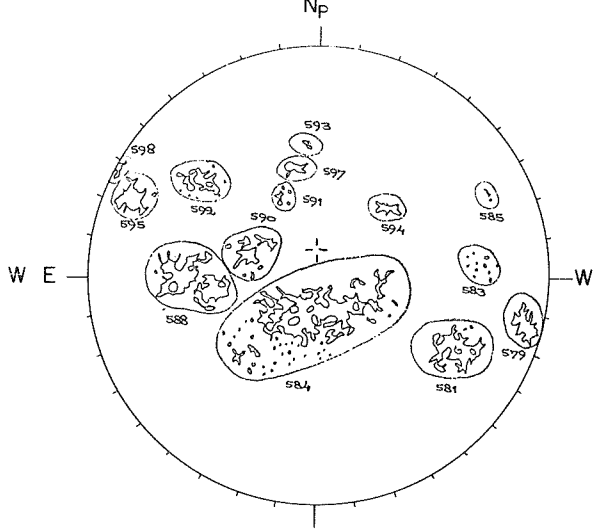
Brightness Unit 5,000° K

FLEURS, AUSTRALIA
21 cm



Resolution 3 Minutes of Arc
02-03 UT Brightness Unit 1,700° K

McMATH-HULBERT
CALCIUM REPORT



1410 UT

GOOD	M
79-40	3.0
81-51	3.0
84-88	3.5
88-54	3.5
90-17	2.5
92-15	3.5
94-06	2.5
95-40	3.5
97-07	3.0
98-08	2.5

FEBRUARY 23, 1970 (P=-19.85, B_o=-7.11, L_o=289.30)

16

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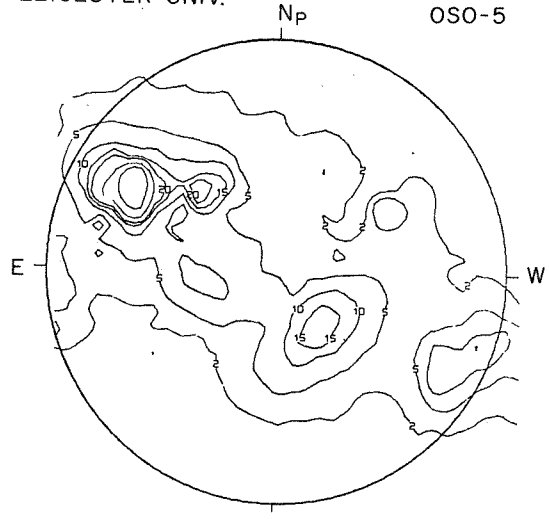
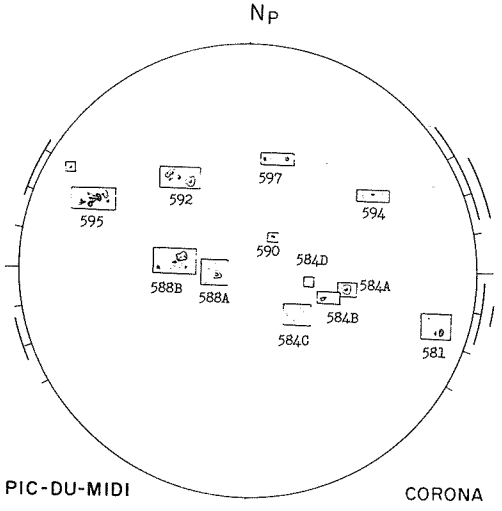
X-RAY
OSO-5



1431-1614 UT

Intensities in Units of 10^{-6} ergs $cm^{-2}sec^{-1}$

ESSA-BOULDER
SUNSPOTS

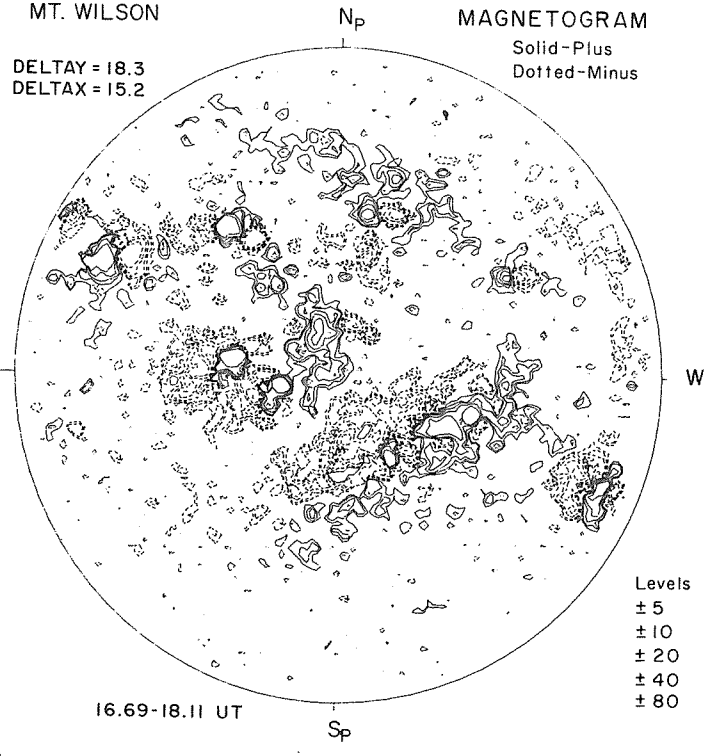


PIC-DU-MIDI

CORONA

2030 UT

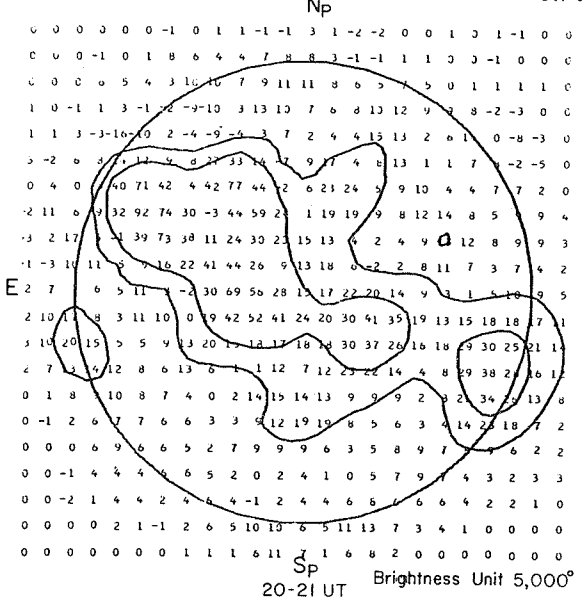
MT. WILSON
MAGNETOGRAM
Solid-Plus
Dotted-Minus



16.69-18.11 UT

Levels
±5
±10
±20
±40
±80

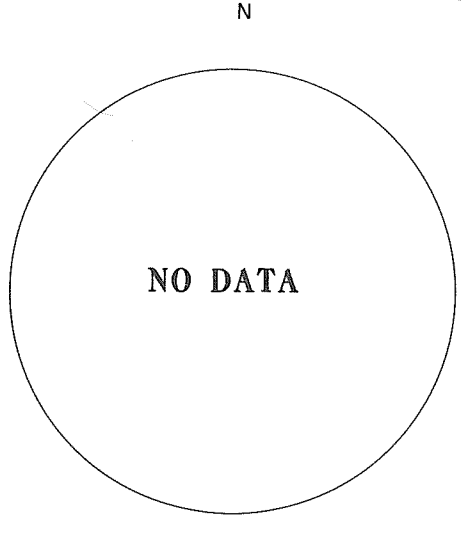
STANFORD
9.1 cm



20-21 UT

Brightness Unit 5,000° K

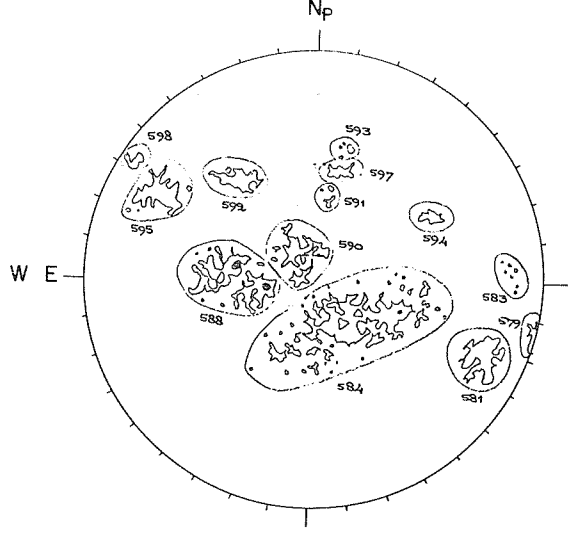
FLEURS, AUSTRALIA
21 cm



Resolution 3 Minutes of Arc

02-03 UT Brightness Unit 1,700° K

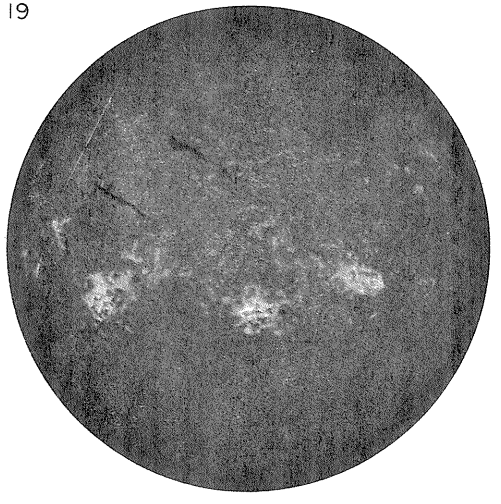
McMATH-HULBERT
CALCIUM REPORT

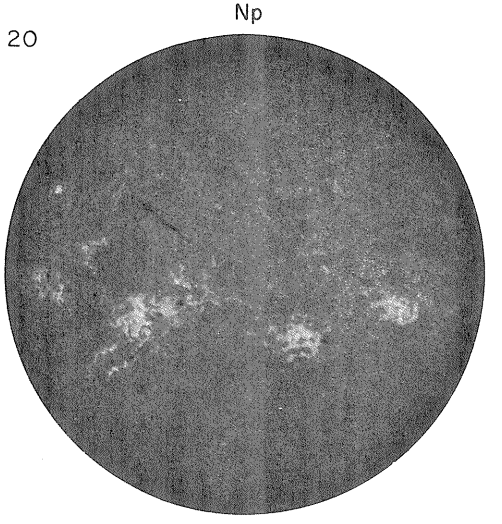


FAIR	M
79-17-2.5	
81-48-3.0	
84-91-3.5	
88-50-3.5	
90-20-2.5	
92-15-3.0	
94-07-3.0	
95-40-3.5	
97-08-3.0	
98-13-2.5	

1320 UT

Hα Boulder, February 1970

BOULDER Hα
19
Np

Sp
1523 UT

BOULDER Hα
20
Np

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1515 UT

BOULDER Hα
21
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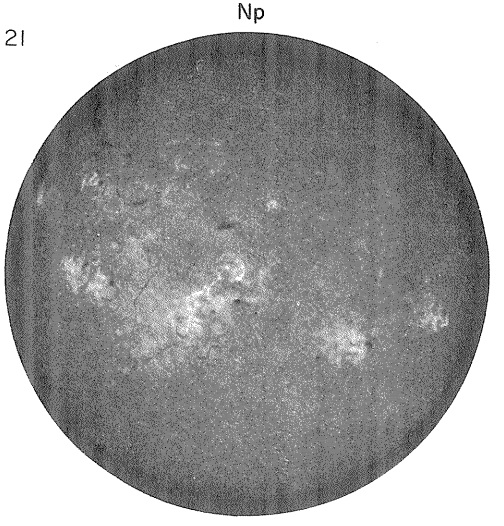
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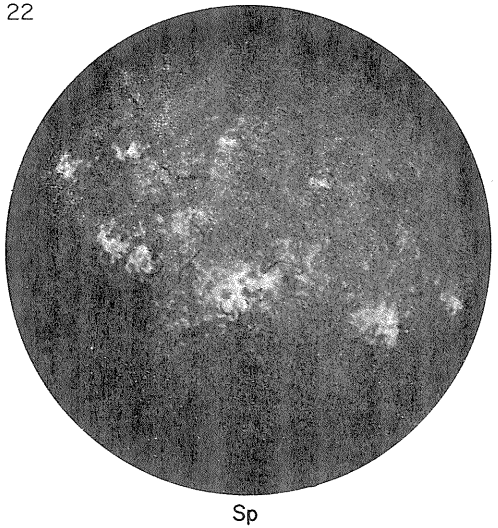
1618 UT

BOULDER Hα
22
Np

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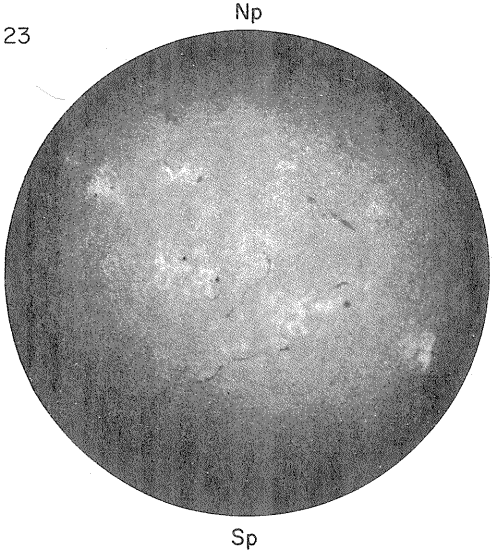
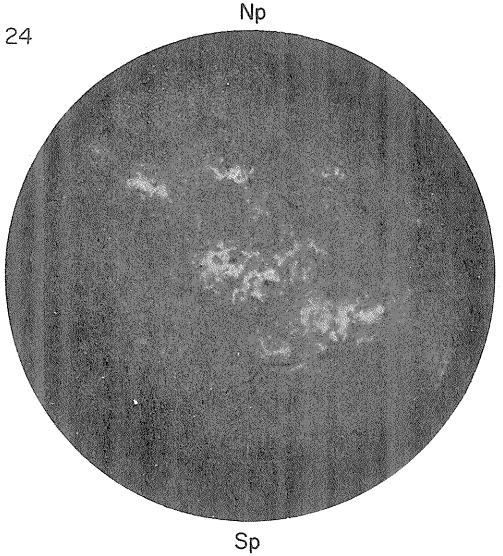
1448 UT

BOULDER Hα
23
Np

Sp
2120 UT

BOULDER Hα
24
Np

Sp
1902 UT

REGIONS OF SOLAR ACTIVITY

Visible on Solar Disk during February 19-23, 1970

MCMATH REGION 10580 CMP DATE 14.7 RETURN OF REGION 10527* ROTATION 2

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	8	10580	S16 E80		500	1.0										
70	2	10	10580	S15 E53		600	1.5										
70	2	11	10580	S15 E40		600	1.5										
70	2	12	10580	S15 E25	38	800	1.5										
70	2	13	10580	S16 E13	37	700	1.5										
70	2	14	10580	S15 E01	38	700	2.0										
70	2	15	10580	S14 W13	37	900	2.5										
70	2	16	10580	S15 W25	38	800	2.0										
70	2	17	10580	S15 W39	38	500	1.5						0	2	A		
70	2	18	10580	S15 W53	40	300	1.5										
70	2	19	10580	S15 W66	40	700	1.5										
70	2	20	10580	S15 W80	41	300	1.0									2	1

MCMATH REGION 10576 CMP DATE 15.1

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	10	10576	N28 E56	34	600	2.5									7	3
70	2	11	10576	N32 E45	34	600	2.5										
70	2	12	10576	N31 E29	34	800	2.0										
70	2	13	10576	N31 E18	32	400	2.0										
70	2	14	10576	N30 E05	33	700	2.0										
70	2	15	10576	N30 W08	32	900	2.0										
70	2	16	10576	N30 W20	33	600	1.5										
70	2	17	10576	N30 W34	33	600	1.5										
70	2	18	10576	N30 W47	34	400	1.0										
70	2	19	10576	N31 W51	25	300	1.0										

MCMATH REGION 10587 CMP DATE 15.1

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	17	10587	N23 W33	32	500	2.5	17749	N21 W33	30	(B)	3	20	8	D	5	2
70	2	18	10587	N23 W46	33	900	3.0	17749	N21 W45	31	(B)	3	70	6	D	6	3
70	2	19	10587	N22 W60	34	1100	3.0	17749	N21 W61	34		0	70	4	D	3	1
70	2	20	10587	N22 W73	34	1200	2.5	17749	N21 W72	32	(BP)	3	50	2	D		

MCMATH REGION 10578 CMP DATE 15.8 RETURN OF REGION 10530* ROTATION 2

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	10	10578	S15 E70	20	600	2.0						0	2	A		
70	2	11	10578	S13 E57		800	2.0						10	1	C		
70	2	12	10578	S13 E38	25	1000	2.5	17732	S11 E36	26	(AP)	3	0	1	A		
70	2	13	10578	S13 E27	23	1000	2.5	17732	S12 E27	24	(B)	2	0	6	B		
70	2	14	10578	S13 E17	22	1300	2.5	17732	S12 E14	24	(BP)	2	10	4	B		
70	2							17740	S13 E21	17	(AP)	1	0	1	A		
70	2	15	10578	S13 E01	23	1100	2.5	17732	S12 W01	26	(B)	2					
70	2	16	10578	S13 W11	24	800	2.5	17732	S12 W11	23	(B)	2	0	1	A		
70	2	17	10578	S13 W24	23	800	2.0										
70	2	18	10578	S12 W37	24	600	2.0										
70	2	19	10578	S11 W52	26	700	2.0										
70	2	20	10578	S12 W66	27	400	2.0										
70	2	21	10578	S12 W80	26	200	1.0										

MCMATH REGION 10577 CMP DATE 15.9 RETURN OF REGION 10531 ROTATION 2

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	10	10577	N13 E70	20	600	2.0									6	3
70	2	11	10577	N15 E60		1000	2.0						0	1	A		
70	2	12	10577	N15 E43	20	1300	2.5						0	2	A	7	3
70	2	13	10577	N14 E30	20	1300	2.0	17738	N14 E29	22	(AP)	2	0	1	A	5	2
70	2	14	10577	N13 E17	22	2000	2.5									4	2
70	2	15	10577	N14 E03	21	1700	2.5	17742	N10 E02	23	(AP)	2					
70	2	16	10577	N14 W09	22	1700	2.0										
70	2	17	10577	N14 W22	21	1400	2.0						0	1	A		
70	2	18	10577	N14 W37	24	1400	2.0										
70	2	19	10577	N15 W49		1400	2.5						0	2	B		
70	2	20	10577	N14 W60	21	1400	2.0										
70	2	21	10577	N14 W75	21	700	1.0										

REGIONS OF SOLAR ACTIVITY

FEBRUARY 1970

MCMATH REGION 10579 CMP DATE 17.6

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	10	10579	S16 E85	5	500	1.5
70	2	11	10579	S12 E78		2100	3.0
70	2	12	10579	S13 E63	0	2700	3.5
70	2	13	10579	S13 E52	359	3000	2.5
70	2						
70	2	14	10579	S14 E41	359	4300	3.0
70	2	15	10579	S14 E26	359	4600	3.0
70	2	16	10579	S13 E13	0	3800	2.5
70	2						
70	2	17	10579	S13 W02	1	3500	3.0
70	2						
70	2	18	10579	S13 W15	2	3000	3.0
70	2	19	10579	S13 W29	3	3800	3.5
70	2	20	10579	S13 W43	4	3900	3.5
70	2	21	10579	S13 W57	3	4000	3.0
70	2	22	10579	S13 W70	4	4000	3.0
70	2	23	10579	S13 W85	6	1700	2.5

RETURN OF REGION 10532 ROTATION 3

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
								13	6
					120	4	D		
17733	S12 E60	2	(B)	5	90	8	D		
17733	S13 E49	2	(BF)	4	130	10	D	11	5
17739	S06 E58	354	(B)	3	0	1	G		
17733	S13 E36	2	(BY)	4	80	16	D	14	6
17733	S14 E24	1	(B)	4	70	22	D	18	8
17747	S07 E07	5	(AF)	1				18	8
17733	S13 E10	2	(BY)	4	130	47	E		
17733	S13 W05	2	(BF)	4	90	42	D	20	9
17747	S09 W04	1	(B)	2					
17733	S13 W16	2	(BY)	4	60	38	D	19	8
17733	S14 W31	4		0	130	46	F	17	7
17733	S15 W45	5	(BY)	4	20	44	C	12	5
17733	S15 W62	4	(AP)	2	10	9	B	14	6
								8	4

MCMATH REGION 10599 CMP DATE 17.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	24	10599	N18 W88	356	300	2.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

MCMATH REGION 10585 CMP DATE 18.6

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	15	10585	N18 E40		300	1.5
70	2	16	10585	N20 E27	347	300	1.5
70	2	17	10585	N21 E14	346	300	1.0
70	2	18	10585	N22 E00	347	300	1.0
70	2	19	10585	N20 W11	345	500	1.5
70	2	20	10585	N19 W24	345	500	1.5
70	2	21	10585	N18 W37	343	300	1.0
70	2	22	10585	N18 W50	344	200	1.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

MCMATH REGION 10583 CMP DATE 19.3

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	13	10583	S02 E79	332	500	1.5
70	2	14	10583	N01 E65	335	700	2.0
70	2	15	10583	N01 E48	337	800	2.5
70	2	16	10583	S02 E37	337	800	2.0
70	2	17	10583	S02 E23	337	600	1.5
70	2	18	10583	S02 E09	338	400	2.0
70	2	19	10583	S03 W06	340	500	2.5
70	2	20	10583	S03 W19	340	400	2.0
70	2	21	10583	S03 W34	340	400	1.5
70	2	22	10583	S03 W46	340	400	1.0
70	2	23	10583	S03 W60	341	300	1.0

RETURN OF REGION 10536* ROTATION 2

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

MCMATH REGION 10581 CMP DATE 19.5

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	12	10581	S23 E80	344	2100	3.5
70	2	13	10581	S23 E78	333	2600	3.5
70	2	14	10581	S23 E77	333	8100	3.5
70	2	15	10581	S23 E50	335	7000	3.5
70	2	16	10581	S23 E37	337	6300	3.0
70	2						
70	2	17	10581	S23 E24	336	5900	3.0
70	2	18	10581	S24 E12	335	5600	3.0
70	2	19	10581	S22 W02	336	6100	3.0
70	2	20	10581	S23 W14	335	5800	3.5
70	2	21	10581	S23 W28	334	6000	3.0
70	2	22	10581	S23 W41	335	5100	3.0
70	2	23	10581	S24 W55	336	4800	3.0
70	2	24	10581	S24 W68	336	4600	3.0
70	2	25	10581	S24 W80	335	3900	3.0
70	2	26	10581	S24 W89	330	700	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
17734	S21 E80	343	(AF)	3	680	1	G	29	13
17734	S21 E75	337	(BY)	5	890	8	E	27	12
17734	S21 E61	338	(D)	5	590	13	E	27	12
17734	S22 E48	338	(D)	6	830	16	E	38	17
17748	S16 E28	345	(B)	1				33	15
17734	S21 E34	339	(BP)	6	820	36	F		
17734	S22 E21		(BP)	6				31	13
17734	S22 E09	337	(BP)	5	500	40	E	22	10
17734	S22 W04	337		0	410	54	F	20	8
17734	S22 W16	336	(BY)	6	330	54	F	17	7
17734	S22 W33	335	(BP)	5	170	34	E	22	9
17734	S22 W43	336	(BP)	5	230	14	E	15	6
17734	S24 W56	334	(BP)	4	0	11	F	13	5
17734	S24 W69	334	(BP)	3	80	2	C	9	4
17734	S24 W88	340		0	70	1	G	8	3
								14	6

REGIONS OF SOLAR ACTIVITY

FEBRUARY 1970

MCMATH REGION 10586 CMP DATE 20.5 RETURN OF REGION 10538 ROTATION 4

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	15	10586	S15 E66		500	1.0										
70	2	16	10586	S15 E53	321	600	1.5										
70	2	17	10586	S15 E37	323	400	1.5										
70	2	18	10586	S15 E25	322	400	1.0										

MCMATH REGION 10594 CMP DATE 21.1

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	20	10594	N11 E07	314	200	2.0	17754	N10 E07	313	(B)	2	0	3	A		
70	2	21	10594	N11 W06	312	500	3.0	17754	N11 W09	311	(BF)	3	30	18	C		
70	2	22	10594	N11 W18	312	600	2.5	17754	N09 W19	312	(BF)	3	40	4	D		
70	2	23	10594	N11 W31	312	700	3.0	17754	N11 W35	313	(BF)	2	0	9	D		
70	2	24	10594	N11 W45	313	700	3.0	17754	N11 W49	314	(B)	1	0	2	B		
70	2	25	10594	N11 W60	315	900	3.0										
70	2	26	10594	N10 W75	316	900	3.5										

MCMATH REGION 10584 CMP DATE 22.6 RETURN OF REGION 10542 ROTATION 4

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	14	10584										170	7	D		
70	2												0	1	A		
70	2	15	10584	S12 E85	300	2200	3.0	17743	S15 E86	300		0	180	4	G	21	9
70	2							17744	S17 E89	297		0					
70	2	16	10584	S13 E75	299	6700	3.5	17743	S15 E73	300	(B)	4	490	17	E	36	16
70	2							17745	S18 E74	299	(AF)	4					
70	2							17744	S19 E85	288	(B)	4					
70	2	17	10584	S13 E63	297	7000	3.5	17743	S15 E60	298	(B)	5	520	31	E	45	20
70	2							17745	S19 E65	293	(BP)	4					
70	2							17744	S19 E70	288	(BP)	4					
70	2	18	10584	S14 E52	295	7100	3.5	17743	S15 E45	301	(BP)	5	200	3	G	35	15
70	2							17745	S18 E52	294	(BP)	4	120	9	D		
70	2							17744	S21 E54	292	(D)	3	150	27	D		
70	2	19	10584	S15 E40	294	8100	3.0	17743	S13 E33	300		0	200	7	G	29	12
70	2							17745	S16 E39	294		0	140	37	D		
70	2							17744	S19 E42	291		0	90	12	D		
70	2	20	10584	S15 E28	293	8800	3.5	17743	S14 E17	303	(AP)	6	210	7	C	26	11
70	2							17745	S16 E22	298	(AP)	5	120	44	C		
70	2							17755	S17 E27	293	(B)	2					
70	2							17744	S20 E29	291	(BP)	2	40	8	D		
70	2	21	10584	S15 E13	293	9000	3.5	17743	S15 E02	300	(BP)	6	200	6	G	34	14
70	2							17745	S17 E08	294		0	90	37	D		
70	2							17757	S10 E10	292		0	0	1	A		
70	2							17744	S19 E15	287		0	10	21	B		
70	2												10	7	B		
70	2	22	10584	S15 E00	294	8800	3.5	17743	S14 W05	298	(BP)	5	260	1	G	17	7
70	2												0	3	A		
70	2							17745	S18 W02	295	(BP)	4	110	8	C		
70	2							17744	S21 E06	287	(B)	2	0	10	B		
70	2	23	10584	S15 W12	293	9100	3.5	17743	S15 W24	302	(AP)	5	0	1	G	15	6
70	2							17745	S17 W18	296	(AP)	4	0	7	C		
70	2												0	3	A		
70	2							17744	S21 W10	288	(B)	1	0	10	B		
70	2							17761	S25 E02	276	(AP)	1	0	1	A		
70	2	24	10584	S15 W25	293	9000	3.5	17743	S14 W38	303	(AP)	5	120	1	G	11	4
70	2							17745	S17 W31	296	(BP)	3	40	6	C		
70	2												0	3	A		
70	2												0	4	B		
70	2	25	10584	S15 W38	293	8800	3.5	17743	S14 W52	304	(AP)	5	240	3	G	10	4
70	2	26	10584	S15 W51	292	8100	3.0	17743	S15 W65	304	(AP)	5	240	1	G		
70	2												0	4	C		
70	2	27	10584	S16 W65	293	7800	3.0	17743	S25 W78	301		0	200	1	G	11	5
70	2	28	10584	S17 W75	290	4300	2.0									19	8
70	3	1	10584	S19 W83	284	600	1.5										

MCMATH REGION 10593 CMP DATE 22.9

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	17	10593	N27 E70		300	1.0										
70	2	18	10593	N28 E55		200	1.5										
70	2	19	10593	N28 E40		200	1.5										
70	2	20	10593	N28 E28		300	2.0										

70	2	21	10593	N27 E16	290	300	2.0
70	2	22	10593	N26 E04	290	300	1.5
70	2	23	10593	N27 W06	287	400	2.0
70	2	24	10593	N27 W20	288	400	1.5
70	2	25	10593	N27 W33	288	300	1.5
70	2	26	10593	N26 W49	290	300	1.5
70	2	27	10593	N26 W62	290	100	1.0

MCMATH REGION 10596 CMP DATE 23.0

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	20	10596	N54 E15	306	200	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

MCMATH REGION 10597 CMP DATE 23.0

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	21	10597	N22 E20		400	2.0
70	2	22	10597	N27 E85	209	600	2.5
70	2	23	10597	N23 W07	268	800	3.0
70	2	24	10597	N23 W20	288	1000	3.0
70	2	25	10597	N23 W34	289	1300	3.5
70	2	26	10597	N22 W48	289	1200	3.5
70	2	27	10597	N22 W60		1400	3.0
70	2	28	10597	N23 W74	289	900	2.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
17758	N21 E15	287		0					
17758	N21 E06	287	(BP)	2	10	8	C		
17758	N21 W09	287	(B)	4	0	12	D		
17758	N21 W22	287	(B)	4	80	10	D	11	5
17758	N21 W37	289	(BF)	4	60	10	D	10	4
17758	N21 W49	288	(BF)	4	60	4	D	7	3
					20	3	B	5	2

MCMATH REGION 10591 CMP DATE 23.3

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	17	10591	N14 E80		300	1.0
70	2	18	10591	N15 E65		200	1.5
70	2	19	10591	N14 E52	282	400	2.0
70	2	20	10591	N14 E38		600	2.0
70	2	21	10591	N14 E24	282	500	2.0
70	2	22	10591	N14 E09	285	300	2.0
70	2	23	10591	N14 W03	284	300	2.0
70	2	24	10591	N14 W17	285	400	1.5
70	2	25	10591	N14 W31	286	300	1.5
70	2	26	10591	N14 W44	285	300	1.5
70	2	27	10591	N14 W58	286	200	1.5
70	2	28	10591	N14 W71	286	400	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

MCMATH REGION 10590 CMP DATE 23.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	18	10590	N04 E75	272	1300	3.5
70	2	19	10590	N00 E60	274	2200	3.0
70	2	20	10590	N00 E46	275	2500	3.0
70	2	21	10590	N00 E32	274	2800	2.5
70	2	22	10590	S01 E17	277	1700	2.5
70	2	23	10590	N00 E04	277	2000	2.5
70	2	24	10590	N00 W11	279	1800	2.5
70	2	25	10590	N00 W26	281	2100	2.5
70	2	26	10590	S02 W39	280	2000	3.0
70	2	27	10590	S01 W52	280	1500	2.5
70	2	28	10590	S01 W65		1500	2.0
70	3	1	10590	N00 W80	281	500	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
					0	4	G		
17752	N04 E53	280		0	10	4	C		
17752	N03 E39	281	(AP)	4	20	5	G		
17752	N02 E21	281		0	20	6	C		
17752	N01 E13	280	(BP)	3	20	6	C		
17752	N01 W04	282	(BP)	2	0	2	G		
17752	N00 W19	284	(AP)	2	0	1	A		
17752	N00 W35	287	(AP)	1	10	1	G		

MCMATH REGION 10611 CMP DATE 23.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	28	10611	N12 W62	277	100	1.5
70	3	1	10611	N13 W76	277	100	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

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MCMATH REGION 10588 CMP DATE 25.2 RETURN OF REGION 10544 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	17	10588	S03 E90	270	800	1.0
70	2	18	10588	S08 E80	267	1500	3.0
70	2						
70	2	19	10588	S05 E80	254	3500	3.5
70	2						
70	2	20	10588	S07 E63	258	6000	3.5
70	2						
70	2	21	10588	S07 E48	258	5100	3.0
70	2						
70	2	22	10588	S07 E34	260	5400	3.5
70	2						
70	2	23	10588	S07 E21	260	5000	3.5
70	2						
70	2	24	10588	S07 E08	260	5200	3.5
70	2						
70	2						
70	2	25	10588	S07 W07	262	5700	3.5
70	2						
70	2						
70	2	26	10588	S07 W20	261	5300	3.0
70	2						
70	2						
70	2	27	10588	S07 W34	262	5000	3.5
70	2						
70	2						
70	2	28	10588	S07 W46	261	5000	3.5
70	2						
70	2						
70	3	1	10588	S06 W62	263	5100	3.0
70	3		10588				
70	3	2	10588				
70	3		10588				
70	3	3	10588				
70	3	4	10588				

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
					200	1	G	13	6
					150	2	G		
17751	S09 E64	269		0	180	1	G	17	7
17753	S02 E75	258		0	320	5	C		
17751	S09 E51	269	(AP)	5	120	2	G	19	8
17753	S04 E64	256	(BP)	5	360	8	D		
17751	S09 E34	268		0	130	3	G	22	9
17753	S04 E46	256		0	180	16	D		
17751	S09 E15	276	(BP)	5	250	5	G	20	8
17753	S04 E36	257	(BP)	4	260	15	D		
17751	S09 E10	268	(BP)	5	0	4	G	26	11
17753	S05 E22	256	(BP)	5	0	14	D		
17762	S07 W05	270	(Y)	4	260	19	D	36	15
17751	S09 W04	269	(AP)	5					
17753	S04 E07	258	(BY)	5	310	19	D		
17762	S08 W19	271	(D)	4	280	20	D	26	11
17751	S09 W18	270	(AP)	5	120	9	C		
17753	S05 W06	258	(BY)	4	220	40	D		
17762	S08 W34	273	(D)	4	0	1	A	25	10
17751	S10 W30	269	(AP)	6	310	23	D		
17753	S05 W18	257	(BP)	5	240	13	C		
17762	S08 W48	271		0	130	10	G	23	9
17751	S10 W47	270		0	130	2	G		
17753	S05 W37	260		0	200	7	C		
					250	15	D		
					170	5	G		
					100	5	G		
					180	6	D	20	8
					160	4	G		
					60	1	G	13	5
					180	1	G		
								12	5
								4	12

MCMATH REGION 10592 CMP DATE 25.2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	19	10592	N18 E80	254	700	2.5
70	2	20	10592	N20 E64	257	1000	3.5
70	2	21	10592	N19 E49	257	1800	3.5
70	2	22	10592	N18 E34	260	1500	2.5
70	2	23	10592	N18 E21	260	1500	3.0
70	2	24	10592	N19 E08	260	1700	3.0
70	2	25	10592	N20 W06	261	1900	3.5
70	2	26	10592	N20 W20	261	1700	3.5
70	2	27	10592	N20 W33	261	2100	3.0
70	2	28	10592	N20 W47	262	2100	3.5
70	3	1	10592	N22 W60	261	2800	3.5
70	3	2	10592				

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
17756	N19 E60	260	(D)	3	50	10	D	6	3
17756	N19 E42	260		0	140	13	D	11	5
17756	N19 E32	261	(BP)	5	500	7	D	22	9
17756	N19 E17	261	(BP)	5	0	10	D	31	13
17756	N19 E04	261	(BP)	5	610	25	D	27	11
17756	N19 W10	262	(BP)	5	540	31	D	32	13
17756	N18 W22	261	(BP)	5	390	14	D	28	12
17756	N18 W37	260		0	290	17	D	24	10
					360	16	D	22	9
					250	8	D	19	7
					90	3	G		

MCMATH REGION 10613 CMP DATE 25.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	27	10613	N11 W22		200	1.5
70	2	28	10613	N11 W35	250	300	2.5
70	3	1	10613	N12 W49	250	400	2.5
70	3	2	10613				

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
					0	5	B		
					0	2	A		
					0	1	A		

MCMATH REGION 10612 CMP DATE 26.1

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	2	28	10612	N05 W33		100	2.0
70	3	1	10612	N06 W48	249	300	2.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
					0	1	A		

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MCMATH REGION 10595 CMP DATE 27.0 RETURN OF REGION 10549 & 10561 ROTATION 2

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	20	10595	N15 E88	273	600	2.0										
70	2	21	10595	N16 E76	230	3000	3.5	17759	N16 E70	232		0	100	15	D	19	8
70	2	22	10595	N16 E62	232	4000	3.5	17759	N15 E59	234	(D)	4	430	9	D	25	11
70	2	23	10595	N16 E47	234	4000	3.5	17759	N16 E44	234	(D)	4	0	20	D	41	17
70	2	24	10595	N17 E34	234	4100	3.5	17759	N16 E31	234	(D)	5	430	44	E	33	13
70	2	25	10595	N17 E20	235	4500	3.5	17759	N16 E16	236	(BY)	4	260	48	E	35	14
70	2	26	10595	N17 E05	236	4000	3.0	17759	N15 E04	235	(BY)	4	260	38	E	41	17
70	2	27	10595	N17 W18	246	4100	3.5	17767	N11 W26	249		0	10	3	B	38	16
70	2							17759	N15 W14	237		0	180	44	D		
70	2	28	10595	N17 W22	237	4000	3.0						220	43	D	33	13
70	3	1	10595	N17 W36	237	3800	3.5						250	35	D	21	8
70	3	2	10595										200	7	C	19	8
70	3	3	10595										160	6	G	63	25
70	3	4	10595										0	3	D	19	8
70	3	5	10595	N17 W89	238	700	1.0									12	5
70	3	6	10595													4	2

MCMATH REGION 10601 CMP DATE 28.4

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	24	10601	S11 E50	218	200	1.0										
70	2	25	10601	S11 E37	218	200	1.0										
70	2	26	10601	S11 E23		100	1.0										

MCMATH REGION 10598 CMP DATE 28.6

CALCIUM PLAGE DATA — SUNSPOT DATA — 9.1 CM

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	2	22	10598					17760	N26 E70	223	(AP)	1	0	2	A		
70	2	23	10598	N27 E70	211	1300	2.5	17760	N26 E57	221	(AP)	2	0	1	G	6	2
70	2	24	10598	N27 E55	213	2500	2.5	17760	N26 E46	219	(AP)	2	20	1	G		
70	2	25	10598	N27 E40	215	2200	3.0	17760	N27 E31	221	(AP)	2					
70	2							17764	N29 E41	211	(B)	2	0	5	B		
70	2	26	10598	N27 E25	216	1500	2.5	17760	N26 E21	218	(B)	1	0	1	G		
70	2							17764	N27 E27	212	(AP)	1	10	1	G		
70	2	27	10598	N27 E13	215	1500	2.5	17760	N26 E06	217		0	10	3	B		
70	2	28	10598	N29 E00	215	1800	2.5										
70	3	1	10598	N29 W14	215	1500	2.5										
70	3	5	10598	N28 W66	215	1400	1.5										

Notes:

Region 10581 is new plage that has developed in the position of old region 10534.
Region 10591 is new, in the position of old 10543.
Region 10598 is new, in the position of old 10550.
Regions 10612 and 10613 have formed on the disk, near the position of old region 10547.
No calcium spectroheliograms were obtained at the McMath-Hulbert Observatory on February 2 and 9, 1970.
No observations were made at Mt. Wilson Observatory on February 4, 9, 10, 11 and 28, 1970.

SOLAR FLARES
Confirmed
FEBRUARY 1970

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS				REMARKS
	DATE 1970 FEB	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT. %	
GRP28061	17	1821	1836	1827	S22	E26	.489	10581	19.7	15	--F				.57				3 3 2 4
RAMY	17	1819	1833	1825	S23	E28	.520	10581	19.9	14	-F		C		.83				DE
MCMA	17	1820	1832D	1829	S22	E28	.514	10581	19.9	12D	-F		C	1829	.31	.40			D
BOUL	17	1824	1839	1827	S21	E23	.444	10581	19.5	15	-N		V						
GRP28063	17	1933	1942	1935	S22	E26	.489	10581	19.8	9	--N				.75				4 4 3 4
RAMY	17	1931	1943	1934U	S23	E27	.508	10581	19.8	12	-N		C		.62				DE
MCMA	17	1932	1940	1935	S22	E28	.514	10581	19.9	8	-N		C	1935	.52	.60			EH
HOUT	17	1934	1944	1936	S23	E28	.520	10581	19.9	10	-F		C		1.10	1.30			
BOUL	17	1934	1942	1936	S21	E22	.431	10581	19.5	8	-N		V						
GRP28065	17	2019	2034	2024	S20	E60	.862	10584	22.3	15	-F				1.24				2 2 1 5
CULG	17	2018	2041	2028	S20	E62	.878	10584	22.5	23	1N		C	2028	1.24	2.64			
BOUL	17	2019	2027	2020	S19	E58	.844	10584	22.2	8	-F		V						
GRP28067	17	2226	2324	2242	S18	E60	.861	10584	22.4	58	1N				2.01				2 1 1 2
CULG	17	2226	2324	2242	S18	E60	.861	10584	22.4	58	1N		C	2242	2.01	4.29			
MANI	17	2251E	2336		S14	E65	.900	10584	22.8	45D	1F	1		2300	2.06	4.01			
GRP28070	18	0335	0402	0338	S11	W09	.170	10579	17.5	27	1N				2.79				3 3 3 4
CULG	18	0335	0404	0338	S08	W09	.156	10579	17.5	29	1B		C	0338	2.48	3.40			SV
MITK	18	0335	0359	0337	S11	W09	.170	10579	17.5	24	1F		C	0337	3.82	3.90			E
MANI	18	0338E	0340D		S13	W09	.186	10579	17.5	2D	1N	1		0339	2.06	2.11			
GRP28071	18	0431	0508	0434	S19	E60	.861	10571	22.7	37	1N				1.39				4 4 4 4
MITK	18	0430	0445D	0432	S17	E61	.869	10571	22.8	15D	1N		C	0432	1.65	3.20			E
CRON	18	0430	0500	0433	S19	E60	.861	10571	22.7	30	-B		C		.80	1.50			
CULG	18	0431	0516	0437	S18	E60	.861	10571	22.7	45	1N		C	0437	1.86	3.60			Z
MANI	18	0431E	0509D		S20	E60	.862	10571	22.7	38D	1N	1		0432	1.24	2.50			
GRP28072	18	0526	0613	0534	S19	E60	.861	10584	22.7	47	-N				1.13				3 3 3 3
CULG	18	0523	0630	0536	S18	E59	.852	10584	22.6	67	1N		C	0536	1.75	3.40			
CRON	18	0529	0600	0532	S19	E60	.861	10584	22.7	31	-B		C		.80	1.50			
MANI	18	0540E	0610		S20	E60	.862	10584	22.7	30D	-N	1		0542	.83	1.68			
GRP28073	18	0641	0717	0648	N01	E75	.967	10590	23.9	36	-N				.84				2 2 2 4
CULG	18	0641	0717	0650	N01	E77	.975	10590	24.1	36	1N		C	0650	.88				
CATA	18	0645E	0650D	0645	S00	E73	.957	10590	23.8	5D	-N			0645	.80			195	
GRP28081	18	1405	1416	1406	S08	E79	.979	10588	24.5	11	-N				.47				2 2 2 3
RAMY	18	1404	1416	1406	S05	E80	.983	10588	24.6	12	-N		C		.41				DE
CATA	18	1405	1410D	1405	S11	E78	.974	10588	24.4	5D	-N			1405	.52			166	
082 RAMY	18	1417	1431	1422	S18	W79	.976	10571	12.7	14	--F		C		.31				DE 3
083 RAMY	18	1431	1446D	1433	N13	W73	.967	10572	13.1	15D	--F		C		.41				DEH 3
GRP28085	18	1803	1840	1808	S19	E51	.777	10584	22.6	37	1N				2.23				4 4 4 4
RAMY	18	1800	1846	1809	S18	E51	.775	10584	22.6	46	1N		C		2.53				F
MCMA	18	1803	1845D	1806	S20	E52	.788	10584	22.7	42D	1N		C	1806	1.29	2.10			EL
HOUT	18	1804	1825	1807U	S19	E50	.766	10584	22.5	21	2N		C		3.30	5.30			L
BOUL	18	1804	1845D	1808	S19	E53	.797	10584	22.7	41D	1N		V						
BOUL	18	1805	1820	1809	S21	E51	.779	10584	22.6	15	1N		C		1.80	2.90			EH
GRP28087	18	2124	2219	2139	S18	E50	.765	10584	22.6	55	1N				2.19				3 3 3 3
CULG	18	2122	2216	2137	S18	E50	.765	10584	22.6	54	1N		C	2137	2.06	3.00			SZ
BOUL	18	2122	2215	2130	S18	E50	.765	10584	22.6	53	-N		V						
BOUL	18	2125	2200	2135	S21	E51	.779	10584	22.7	35	1N		C		1.80	2.90			EH
HOUT	18	2140E	2225D	2146U	S18	E49	.754	10584	22.6	45D	1N		C		2.70	4.00			
GRP28092	19	0253	0308	0256	S13	W28	.473	10579	17.0	15	-N				1.04				2 2 2 5
MANI	19	0253	0314	0256	S12	W28	.470	10579	17.0	21	-N	3		0256	.83	.92			
MITK	19	0253E	0302	0255	S14	W27	.461	10579	17.1	9D	-N		C	0255	1.24	1.40			E
GRP28093	19	0323	0421	0331	S18	E48	.743	10584	22.7	58	1B				3.30				4 4 4 4
CULG	19	0322	0437D	0329	S19	E48	.745	10584	22.7	75D	2N		P	0329	4.95	6.96			RS
MANI	19	0322	0440	0332	S18	E48	.743	10584	22.7	78	1B	3		0332	3.35	5.23			
VORO	19	0324	0356	0334	S16	E49	.752	10584	22.8	32	1B		C	0334	2.59	3.70		138	EJ
CRON	19	0325	0410	0330	S19	E48	.745	10584	22.7	45	1N		C		2.30	3.30			EZ
GRP28095	19	0800	0823	0809	S13	W31	.516	10579	17.0	23	1F				2.22				3 3 3 4
MANI	19	0758	0835	0809	S12	W31	.515	10579	17.0	37	1F	3		0809	2.32	2.70			
HTPR	19	0802	0813	0808	S14	W31	.519	10579	17.0	11	-F		C	0808	1.03	1.10			E
CULG	19	0804E	0820D		S12	W32	.529	10579	16.9	16D	1N		P	0804	3.30	3.68			

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS					REMARKS
	DATE 1970	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS AREA Sq. Deg.	CORR AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT	
	FEB																		
GRP28096	19	0842	0855	0847	S13	W30	.502	10579	17.1	13	-N				1.23				5 5 5 6
MANI	19	0841	0857	0846	S12	W29	.485	10579	17.2	16	-N	3		0846	1.13	1.30			
HTPR	19	0842	0853	0847	S14	W31	.519	10579	17.0	11	-F		C	0847	.83	.90			
CAPS	19	0842E	0856D		S13	W30	.502	10579	17.1	14D	-N	1	S	0846	1.20	1.40		190	
MONT	19	0842E	0959	0846	S14	W29	.490	10579	17.2	77D	-N		C	0846	1.55				H
CATA	19	0850E	0855D	0850	S13	W31	.516	10579	17.0	5D	-B			0850	1.44	1.69		214	
GRP28098	19	0931	0953	0938	S23	E03	.280	10581	19.6	22	-N				2.34				5 6 6 6
MANI	19	0930	0945D	0936	S22	E02	.261	10581	19.5	15D	-N	2		0936	1.65	1.70			
HTPR	19	0930	0958	0940	S23	E03	.280	10581	19.6	28	1B		C	0940	3.09	3.10			EU
CRON	19	0930	0945	0936	S28	W01	.359	10581	19.3	15	-N		C		1.30	1.30			E
MONT	19	0931	1006	0940	S23	E04	.284	10581	19.7	35	1B		C	0940	4.13				H
KIEV	19	0932	0950	0937	S21	E07	.268	10581	19.9	18	1N		C	0937	2.06	2.10		65	EI
CAPS	19	0934E	0940D		S23	E00	.276	10581	19.4	6D	-N	2	V	0935	1.80	1.80		182	
1 STATIONS REPORTING GROUP 28103. 4 STATIONS OBSERVING AND NOT REPORTING.																			
103 SANM	19	1201	1237		S14	W29	.490	10579	17.3	36	1N	1	C	1216	1.94	2.24			E 5
103 SANM	19	1201	1237	1205	S14	W29	.490	10579	17.3	36	*-N	1	C		.80	.93			EIK 6
4 STATIONS REPORTING GROUP 28104. 2 STATIONS OBSERVING AND NOT REPORTING.																			
GRP28104	19	1331	1400	1340	S15	W31	.521	10579	17.2	29	-N				1.19				4 4 4 6
SANM	19	1321	1359	1340	S14	W33	.547	10579	17.1	38	1B	1	C		2.59	3.08			EL
HTPR	19	1331	1336D		S15	W30	.507	10579	17.3	5D	-F		C	1334	.52	.60			E
RAMY	19	1335	1400	1339	S15	W30	.507	10579	17.3	25	-F		C		.62				DE
MCMA	19	1335E	1349D		S15	W31	.521	10579	17.2	14D	-N		C	1340	1.03	1.20			E
28104	19	1349	1357	1350	S15	W35	.577	10579	17.0	8	*-N				1.45				2 2 2 6
SANM	19	1321	1359		S14	W33	.547	10579	17.1	38	1N	1	C	1351	2.59	3.16			E
MCMA	19	1349	1355	1350	S15	W36	.590	10579	16.9	6	-N		C	1350	.31	.40			E
GRP28107	19	1519	1537	1527	S22	E00	.259	10581	19.6	18	--F				.72				3 2 1 6
SANM	19	1505	1540	1527	S11	W02	.078	10581	19.5	35	-F	1	C		.97	1.00			E
MCMA	19	1518	1538	1527	S22	E00	.259	10581	19.6	20	-F		C	1527	.72	.80			E
BOUL	19	1520	1535	1527	S21	E00	.242	10581	19.6	15	-N		V						
GRP28109	19	1711	1732	1714	S14	W38	.615	10579	16.9	21	--N	(See unconfirmed list for details.)							
GRP28110	19	1729	1737	1730	S06	E68	.924	10588	24.8	8	--F				.48				3 3 2 5
SANM	19	1725	1733	1727	S08	E65	.902	10588	24.6	8	-N	1	C		.65	1.54			D
MCMA	19	1727	1735	1728	S08	E65	.902	10588	24.6	8	-F		C	1728	.31	.70			D
BOUL	19	1734	1744	1735	S02	E73	.956	10588	25.2	10	-F		V						
GRP28111	19	1748	1820	1755	S22	W02	.261	10581	19.6	32	-B				1.32				4 4 3 5
SANM	19	1745	1820	1754	S22	W04	.267	10581	19.4	35	-B	1	C		1.29	1.34			EL
MCMA	19	1747	1815	1756	S22	W01	.260	10581	19.7	28	-N		C	1756	1.03	1.10			E
BOUL	19	1748	1812	1755	S20	W02	.228	10581	19.6	24	-B		V						
RAMY	19	1750	1828	1756	S23	W01	.276	10581	19.7	38	-N		C		1.65				F
BOUL	19	1750	1815	1754	S23	W03	.280	10581	19.5	25	-N		C		1.50	1.60			E
GRP28112	19	1844	1858	1848	N21	W69	.957	10587	14.6	14	--F				.37				2 2 2 4
RAMY	19	1843	1859	1848	N20	W68	.951	10587	14.7	16	-F		C		.41				DE
SANM	19	1845	1856		N22	W69	.959	10587	14.6	11	-F	1	C	1850	.32				D
GRP28113	19	1853	1912	1855	S21	W03	.247	10581	19.6	19	--F				1.06				3 3 2 4
SANM	19	1850	1900	1854	S20	W03	.231	10581	19.6	10	-F	1	C		1.29	1.34			E
MCMA	19	1851	1920D	1854	S22	W03	.264	10581	19.6	29D	-F		C	1854	.83	.90			E
BOUL	19	1857	1916	1858	S20	W02	.228	10581	19.6	19	-F		V						
GRP28114	19	1855	1903	1858	S14	W39	.628	10579	16.9	8	--N				.32				2 2 2 4
SANM	19	1854	1901	1858	S13	W40	.640	10579	16.8	7	-B	1	P		.32	.42			E
MCMA	19	1855	1905	1858	S14	W38	.615	10579	16.9	10	-F		C	1858	.31	.40			E
GRP28115	19	1922	1959	1928	S22	W03	.264	10581	19.6	37	--N				.85				4 4 4 4
SANM	19	1921	1955	1925	S22	W04	.267	10581	19.5	34	-N	1	C		.65	.68			EL
BOUL	19	1922	1952	1926	S21	W02	.245	10581	19.7	30	-N		V						
MCMA	19	1923	2005	1926	S22	W03	.264	10581	19.6	42	-N		C	1926	.52	.50			EH
RAMY	19	1923	2004	1928	S22	W02	.261	10581	19.7	41	-N		C		.93				DE
BOUL	19	1925	1950	1931	S22	W03	.264	10581	19.6	25	-N		C		1.30	1.40			
GRP28116	19	1955	2012	2000	S03	E74	.960	10588	25.4	17	-N				.56				5 5 5 6
SANM	19	1951	2010	1959	S03	E75	.965	10588	25.5	19	-B	1	C		.32				D
BOUL	19	1951	2005	1958	S05	E71	.943	10588	25.2	14	-N		C		.50	1.30			
BOUL	19	1952E	1958D	1958	S03	E72	.950	10588	25.2	6D	-N		V						
MCMA	19	1955	2009	1958	S03	E72	.950	10588	25.2	14	-N		C	1958	.31	1.00			D
RAMY	19	1958	2023	2003	S02	E75	.965	10588	25.5	25	-F		C		.93				DE
CULG	19	2000	2015	2003	S03	E75	.965	10588	25.5	15	1N		C	2003	.72				
117 BOUL	19	2307	2326	2312	S20	E37	.618	10584	22.7	19	1F		C		2.50	3.10			2

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS					REMARKS
	DATE 1970 FEB	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX INT %	
GRP28118	19	2318	2342	2324	S07	E63	.887	10588	24.7	24	-F				1.65				2 2 1 3
CULG	19	2309	2342	2319	S07	E62	.879	10588	24.6	33	1N		C	2319	1.65	3.60			
BOUL	19	2327	2329D	2328	S06	E63	.887	10588	24.7	2D	-F		V						
GRP28119	19	2322	2336	2324	S19	W04	.219	10581	19.7	14	-N				1.89				3 3 3 3
CULG	19	2322	2344	2324	S20	W05	.240	10581	19.6	22	1B		C	2324	2.68	2.60			UH
BOUL	19	2322	2330D	2324	S20	E00	.225	10581	20.0	8D	-B		V						
BOUL	19	2322	2330	2324	S11	W05	.111	10581	19.6	8	-N		C		1.20	1.30			
CRON	19	2323	2335	2325	S22	W05	.272	10581	19.6	12	-F		C		1.80	1.90			
120 MANI	20	0419	0428D	0421	S22	W10	.306	10581	19.4	9D	-N	1		0421	1.65	1.74			2
GRP28121	20	0647	0710	0649	S22	W09	.298	10581	19.6	23	-N				1.05				2 2 2 4
MANI	20	0646	0701D	0649	S22	W10	.306	10581	19.5	15D	-N	1		0649	.93	.98			
ABST	20	0648	0710	0648	S21	W08	.275	10581	19.7	22	-N		C	0648	1.17	1.10		58	E
GRP28122	20	0739	0802	0746	S23	W13	.347	10581	19.3	23	-N				1.35				4 4 4 6
HTPR	20	0738	0750D	0748	S22	W14	.345	10581	19.3	12D	-F		C	0748	1.24	1.30			E
ABST	20	0739	0800	0744	S24	W11	.342	10581	19.5	21	-N		P	0744	.90	1.00		55	D
CAPS	20	0741E	0801D		S21	W14	.333	10581	19.3	20D	-N		V	0749	1.30	1.30		182	C
MANI	20	0742E	0805		S23	W11	.328	10581	19.5	23D	-N	1		0745	1.96	2.07			
GRP28123	20	0753	0816	0755	S13	E31	.516	10584	22.7	23	-N				1.00				3 3 2 5
CAPS	20	0752	0807D		S12	E29	.485	10584	22.5	15D	-N		V						
ABST	20	0753	0815	0755	S13	E33	.545	10584	22.8	22	-N		C	0755	1.07	1.30		49	D
MANI	20	0758E	0817D		S14	E32	.533	10584	22.7	19D	-F	1		0805	.93	1.11			
8 STATIONS REPORTING GROJP 28124. 0 STATIONS OBSERVING AND NOT REPORTING.																			
GRP28124	20	0945	1059	1004	S19	E32	.549	10584	22.8	74	2B				8.91				4 4 4 8
CATA	20	0945	1120D	1008	S18	E33	.559	10584	22.9	95D	3B			1008	16.24	19.59		380	I
CAPF	20	0952E	1052		S18	E32	.545	10584	22.8	60D	2N		C	0959	6.19	7.50			HL
HERS	20	0956E	1045	0956U	S20	E34	.580	10584	23.0	49D	1B		P	0959	4.19	5.10	2.30		FL
LOCA	20	1007E	1100D	1007	S18	E30	.518	10584	22.7	53D	2B		V	1007	9.03	10.40			
28124	20	0943	1050	0947	S17	E33	.555	10584	22.9	67	*2B				7.37				4 4 4 6
MONT	20	0941	1007D	0947	S19	E32	.549	10584	22.8	26D	3B		C	0947	13.41				
ABST	20	0943	1050	0948	S14	E34	.561	10584	23.0	67	2F		C	0948	8.97	10.60		96	E
HTPR	20	0944	1010D	0947	S17	E31	.528	10584	22.7	26D	1B		C	0947	3.61	4.20			CEV
CAPS	20	0947E	1048D		S18	E33	.559	10584	22.9	61D	1B	2	P	0949	3.50	4.10		369	U
GRP28125	20	1147	1229	1155	S22	W14	.345	10581	19.4	42	-B				1.43				2 2 2 5
RAMY	20	1147	1220	1155	S22	W12	.325	10581	19.6	33	-N		V		1.24				F
SANM	20	1154E	1237		S21	W15	.345	10581	19.4	43D	-B	1	P	1154	1.62	1.72			B
GRP28129	20	1512	1529	1519	S12	W43	.678	10579	17.4	17	--N				.68				3 3 2 5
RAMY	20	1507	1529	1519	S12	W45	.702	10579	17.3	22	-F		V		.83				F
BOUL	20	1516	1528	1518	S13	W40	.640	10579	17.6	12	-N		V						
MCMA	20	1519E	1525D		S12	W43	.678	10579	17.4	6D	-N		C	1520	.52	.70			E
GRP28130	20	1717	1743	1724	S13	W45	.703	10579	17.3	26	-N				1.45				3 3 3 4
RAMY	20	1717	1750	1726	S12	W45	.702	10579	17.3	33	-F		V		1.34				F
BOUL	20	1717	1745	1722	S15	W48	.740	10579	17.1	28	1N		C		2.30	3.50			EK
BOUL	20	1717	1745	1730	S15	W48	.740	10579	17.1	28	1N								
BOUL	20	1717	1745	1724	S13	W44	.691	10579	17.4	28	-N		V						
MCMA	20	1718	1735	1724	S12	W45	.702	10579	17.3	17	-N		C	1724	.72	1.00			E
GRP28131	20	1807	1825	1810	S22	W18	.390	10581	19.4	18	--F				.36				2 2 1 4
BOUL	20	1807	1825	1810	S21	W17	.368	10581	19.5	18	-F		V						
MCMA	20	1809E	1825		S22	W18	.390	10581	19.4	16D	-N		C	1813	.36	.40			E
GRP28132	20	2100	2115	2104	S22	W19	.402	10581	19.5	15	--F				.52				2 1 1 3
RAMY	20	2100	2115	2104	S22	W19	.402	10581	19.5	15	-F		V		.52				F
BOUL	20	2102	2114	2104	S21	W29	.520	10581	18.7	12	-F		V						
133 BOUL	20	2227	2231	2228	S11	E15	.265	10584	22.1	4	-N		V						1
GRP28135	20	2332	2357	2337	S17	E24	.430	10584	22.8	25	-B				1.08				2 2 2 3
MANI	20	2330	0012	2339	S17	E23	.416	10584	22.7	42	-N	1		2339	1.13	1.21			
VORO	20	2333	2341	2334	S17	E24	.430	10584	22.8	8	-B		C	2334	1.02	1.10		85	EJ
GRP28136	21	0012	0027	0015	S10	E51	.771	10588	24.8	15	-B				.83				2 2 2 3
MANI	21	0011	0032	0014	S10	E50	.760	10588	24.8	21	-N	1		0014	.72	1.11			
VORO	21	0012	0022	0015	S09	E51	.772	10588	24.8	10	-B		C	0015	.93	1.10		78	E
GRP28137	21	0152	0224	0200	S07	E49	.750	10588	24.8	32	-N				1.29				2 2 2 3
MANI	21	0152	0224	0200	S07	E49	.750	10588	24.8	32	-N	2		0200	1.13	1.75			
KODA	21	0154E	0210D		S06	E48	.739	10588	24.7	16D	-N		P	0159	1.45	1.50			E

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OBSERV-ATORY	OBSERVED UT				LOCATION						DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS				REMARKS
	DATE	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY		MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT %	
	1970 FEB																		
GRP28144	21	0933	1008	0944	S20	E18	.370	10584	22.7		35	1N				3.11				4 3 3 4
MONT	21	0933	1006	0943	S20	E17	.358	10584	22.7		33	1N		C	0943	4.54				H
CAPS	21	0933E	0958D		S19	E19	.375	10584	22.8		25D	1N	1	S	0938	2.00	2.10		189	CH
CRON	21	0934	1000D	0944U	S21	E17	.368	10584	22.7		26D	1N		C		2.80	4.20			H
TEHR	21	0950E	1010D		S16	E14	.282	10584	22.5		20D	1N								
TEHR	21	0950E	1010D	0955	S17	E18	.345	10584	22.8		20D	1N								
TEHR	21	0950E	1008D	0958	S16	E15	.296	10584	22.5		18D	-F								
GRP28147	21	1037	1130		N16	E80	.991	10595	27.5		53	-N								1 1 0 3
TEHR	21	1037	1050D		N18	E79	.990	10595	27.4		13D	1N								
TEHR	21	1055E	1130D		N14	E80	.990	10595	27.5		35D	-N								
148 MONT	21	1110	1122	1114	N23	W88	1.000	10587	14.9		12	-N		C	1114	.77				2
150 CATA	21	1310E	1325D	1310	S08	E52	.783	10588	25.4		15D	-N			1310	.87	1.45		168	3
GRP28151	21	1423	1540		S12	E11	.207	10584	22.4		77	1F				1.27				2 2 1 3
HOUT	21	1423	1535D	1450	S13	E12	.229	10584	22.5		72D	2F								
HOUT	21	1423U	1535D	1430	S13	E12	.229	10584	22.5		72D	2F		C		8.10	8.10			EK
CATA	21	1500	1540D	1505	S10	E10	.179	10584	22.4		40D	-N			1505	1.27	1.29		193	
	21	1535	1559	NO FLARE PATROL																
GRP28152	21	1602	1620	1604	N17	E72	.966	10595	27.1		18	--N				.26				2 2 1 2
RAMY	21	1600	1605D	1602	N15	E72	.964	10595	27.1		5D	-N		C		.26				DE
BOUL	21	1603	1620	1605	N18	E71	.963	10595	27.0		17	-N		V						
	21	1605	1630	NO FLARE PATROL																
153 RAMY	21	1630E	1643		N26	E90	1.001	10598	28.4		13D	--F		C						DE 1
GRP28154	21	1819	1839	1823	S22	W33	.576	10581	19.3		20	-N				1.29				2 2 1 2
RAMY	21	1818	1838	1824	S23	W32	.569	10581	19.4		20	-N		C		1.29				F
BOUL	21	1820	1840	1822	S20	W33	.566	10581	19.3		20	-N		V						
GRP28155	21	1850	1915	1855	N17	E72	.966	10595	27.2		25	--N				.41				2 2 1 2
BOUL	21	1850	1910	1853	N18	E74	.975	10595	27.3		20	-N		V						
RAMY	21	1854E	1919	1856U	N15	E70	.955	10595	27.0		25D	-N		C		.41				DE
156 RAMY	21	1903	1930	1914U	S07	E01	.017	10584	21.9		27	--F		C		1.03				F 2
157 RAMY	21	1929	1942	1931	N15	E70	.955	10595	27.1		13	-N		C		.67				DE 2
158 RAMY	21	1948	1954	1950	N16	E40	.717	10592	24.8		6	--F		C		.21				DE 2
GRP28159	21	2118	2148	2127	S22	W31	.551	10581	19.6		30	-N				1.87				5 5 4 5
CULG	21	2114	2205	2125	S22	W33	.576	10581	19.4		51	1N		C	2125	2.68	3.12			V
RAMY	21	2116	2135D	2134U	S23	W31	.556	10581	19.6		19D	-N		C		1.80				F
HOUT	21	2120	2135	2125	S24	W31	.562	10581	19.6		15	-N		C		1.70	2.00			E
MCMA	21	2120E	2149D		S23	W32	.569	10581	19.5		29D	-N		P	2128	1.29	1.60			E
BOUL	21	2120	2156	2122	S20	W27	.488	10581	19.9		36	1B		V						
GRP28160	21	2134	2212	2142	S27	E07	.359	10584	22.4		38	1N				4.70				3 3 2 3
CULG	21	2133	2241	2140	S27	E07	.359	10584	22.4		68	2N		C	2140	6.19	6.42			GHLSR
BOUL	21	2135	2149	2143	S26	E06	.339	10584	22.3		14	-N		V						
HOUT	21	2135	2205D	2142	S28	E07	.374	10584	22.4		30D	1N		C		3.20	3.50			EL
161 VORO	21	2314	2318	2315	N17	E39	.712	10592	24.9		4	--B		C	2315	.56	.80		68	D 3
GRP28164	22	0319	0349	0322	S28	E05	.366	10584	22.5		30	1N				2.93				3 3 3 5
CULG	22	0317	0329D	0322	S28	E04	.363	10584	22.4		12D	2B		P	0322	5.16	5.35			GRLUS
CRON	22	0320	0349	0321	S29	E05	.382	10584	22.5		29	-N		C		1.30	1.40			EH
MANI	22	0321	0325D		S26	E05	.334	10584	22.5		4D	1N	2		0325	2.32	2.50			
GRP28166	22	0612	0628	0614	N14	E64	.920	10595	27.1		16	-N				.80				2 2 2 3
ABST	22	0611	0635	0614	N14	E65	.926	10595	27.1		24	-N		C	0614	.90				D
CRON	22	0612	0620	0613	N13	E62	.905	10595	26.9		8	-N		C		.70	1.50			
GRP28167	22	0743	0805	0747	S19	E07	.237	10584	22.8		22	-N				1.52				2 2 2 2
CRON	22	0741	0804	0748U	S20	E07	.252	10584	22.8		23	1F		C		2.10	2.10			
CATA	22	0745	0805D	0745	S18	E07	.223	10584	22.8		20D	-B			0745	.93	.95		436	
	22	0820	0830	NO FLARE PATROL																
GRP28168	22	1120	1144	1124	S07	E29	.481	10588	24.6		24	--F				.54				2 2 2 4
RAMY	22	1119	1146	1125	S07	E28	.466	10588	24.6		27	-N		C		.67				DE
HTPR	22	1121	1141	1123	S06	E30	.497	10588	24.7		20	-F		C	1123	.41	.40			

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS					REMARKS
	DATE	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME — UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT. %	
	1970 FEB																		
5 STATIONS REPORTING GROUP 28169.					1 STATIONS OBSERVING AND NOT REPORTING.														
GRP28169	22	1136	1213	1146	S23	W39	.652	10581	19.6	37	1N				2.09				3 3 3 6
SANM	22	1135	1213	1145	S24	W40	.668	10581	19.5	38	1N	1	C		1.62	2.18			E
RAMY	22	1136	1150D	1146U	S24	W39	.656	10581	19.6	140	-N		C		1.65				F
CAPS	22	1137	1209D		S20	W38	.630	10581	19.6	320	1N	1	S	1149	3.00	3.90			F
28169	22	1137	1225	1159	S24	W40	.668	10581	19.5	48	*1N				3.51				2 1 1 5
CAPF	22	1137E	1225D		S24	W40	.668	10581	19.5	480	1N		P	1211	3.51	4.59			
HTPR	22	1139	1216	1159	S23	W40	.664	10581	19.5	37	-F		C	1159	1.44	1.80			E
GRP28175	22	1423	1433	1426	N14	E57	.869	10595	26.9	10	1B				.96				3 3 3 5
SANM	22	1421E	1437		N13	E57	.867	10595	26.9	160	1B	1	P	1426	1.13	2.27			D
MCMA	22	1423	1430	1425	N15	E57	.872	10595	26.9	7	-B		C	1425	.52	1.10			D
HTPR	22	1424	1431	1426	N15	E57	.872	10595	26.9	7	1N		C	1426	1.24	2.40			
GRP28176	22	1536	1551	1543	N15	E56	.864	10595	26.9	15	-N				.87				3 3 3 4
MCMA	22	1535	1550	1541	N15	E57	.872	10595	26.9	15	-N		C	1541	.52	1.10			D
SANM	22	1535	1550	1542	N14	E56	.861	10595	26.8	15	-B	1	C		.97	1.83			D
HTPR	22	1538	1554	1545	N16	E56	.866	10595	26.9	16	1N		C	1545	1.13	2.20			
4 STATIONS REPORTING GROUP 28178.					0 STATIONS OBSERVING AND NOT REPORTING.														
GRP28178	22	1618	1649	1631	S19	W02	.209	10584	22.5	31	-F				1.83				4 4 3 4
HTPR	22	1615	1635D		S20	W01	.224	10584	22.6	200	-N		C	1633	2.06	2.00			
MCMA	22	1615	1710	1631	S20	W02	.226	10584	22.5	55	-N		C	1631	.83	.80			E
SANM	22	1616	1637		S18	W03	.196	10584	22.5	21	1F	1	C	1631	2.59	2.65			E
BOUL	22	1626	1640	1630	S19	E00	.207	10584	22.7	14	1F		V						
28178	22	1617	1631	1620	S18	E00	.190	10584	22.7	14	*-N				.45				2 2 1 4
SANM	22	1616	1637	1620	S18	W03	.196	10584	22.5	21	-F	1	C		.45	.46			EK
BOUL	22	1617	1624	1619	S18	E03	.196	10584	22.9	7	-B		V						
GRP28180	22	1859	1931	1911	N17	E34	.661	10592	25.3	32	--N				.77				4 4 3 4
SANM	22	1858	1932	1909	N16	E34	.653	10592	25.3	34	-B	1	C		.97	1.26			E
MCMA	22	1900	1935	1908	N18	E34	.668	10592	25.3	35	-F		C	1908	.52	.60			EH
BOUL	22	1900	1909	1902	N16	E35	.664	10592	25.4	9	-F		V						
BOUL	22	1910	1927	1912	N18	E36	.688	10592	25.5	17	-N		V						
RAMY	22	1914E	1930	1914U	N18	E31	.637	10592	25.1	160	-N		C		.83				F
GRP28181	22	1928	1948	1929	S17	E03	.180	10584	23.0	20	--F				.50				2 2 2 4
SANM	22	1927	1936	1928	S21	E02	.243	10584	23.0	9	-F	1	C		.48	.50			D
MCMA	22	1928	2000	1929	S12	E03	.100	10584	23.0	32	-N		C	1929	.52	.50			EK
182 RAMY	22	2202	2204D	2204U	N15	E52	.830	10595	26.8	20	--F		C		.36				DE 2
183 BOUL	22	2253	2310	2256	S19	W03	.213	10584	22.7	17	--F		V						2
184 MANI	22	2307E	2322		N16	E52	.833	10595	26.9	150	--F	1		2310	.31	.53			2
185 MANI	22	2330	2351	2336	S06	E30	.497	10588	25.2	21	--B	2		2336	.52	.60			1
186 MANI	22	2349	0008	2356	N17	E53	.845	10595	27.0	19	--F	2		2356	.31	.46			2
187 MANI	22	2352	0015	2355	S06	E23	.389	10588	24.7	23	--N	2		2355	.41	.45			2
188 MANI	23	0058	0137	0106	N23	W04	.505	10597	22.7	39	--N	2		0106	.36	.42			2
189 MANI	23	0109	0122	0113	N16	E52	.833	10595	26.9	13	--N	2		0113	.46	.80			2
190 MANI	23	0121	0141		S06	E21	.357	10588	24.6	20	--N	3		0123	.52	.60			2
GRP28191	23	0207	0225	0210	N17	E53	.845	10595	27.1	18	1B				2.17				3 3 3 3
CRON	23	0204	0218	0206	N16	E53	.842	10595	27.1	14	-N		C		1.20	2.00			
MANI	23	0209	0240	0212	N17	E52	.836	10595	27.0	31	1B	3		0212	1.44	2.41			
KODA	23	0211E	0217	0211	N18	E55	.864	10595	27.2	60	1B		P	0213	3.87	3.90	2.28		CD
193 MANI	23	0235	0247	0238	S19	W45	.711	10581	19.7	12	-N	3		0238	.93	1.37			3
GRP28197	23	0547	0613	0556	N18	E29	.617	10592	25.4	26	-N				1.03				4 4 2 5
TEHR	23	0545E	0615D		N18	E26	.586	10592	25.2	300	1N								
MANI	23	0549	0613D	0555	N18	E30	.627	10592	25.5	240	-N	2		0555	.98	1.23			
SIBE	23	0554E	0603		N20	E29	.634	10592	25.4	90	1F		V						D
ABST	23	0557E	0620	0557	N17	E31	.629	10592	25.6	230	-N		P	0557	1.07	1.40			D .
GRP28200	23	0655	0705	0658	N17	E49	.810	10595	27.0	10	-N				.89				2 2 2 4
ABST	23	0655	0705	0658	N17	E48	.801	10595	26.9	10	-N		C	0658	.90	1.50			D
MANI	23	0657E	0705		N17	E49	.810	10595	27.0	80	-N	1		0700	.88	1.41			

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS					REMARKS
	DATE 1970 FEB	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT. %	
GRP28208	23	1050	1130	1127	N16	E49	.806	10595	27.1	40	--F				.32				2 2 1 4
TEHR	23	1050E	1130D		N16	E52	.833	10595	27.4	40D	-F								
SANM	23	1126	1130	1127	N16	E46	.778	10595	26.9	4	-F	1	C		.32	.51			D
GRP28212	23	1453	1506	1457	N12	W33	.615	10594	21.1	13	--B				.75				4 4 4 5
MCMA	23	1453	1505	1455	N12	W33	.615	10594	21.1	12	-N		C	1455	.52	.60			DHV
SANM	23	1453	1510	1455	N12	W35	.639	10594	21.0	17	-N	1	C		1.13	1.46			D
CAPS	23	1454E	1505D		N10	W30	.565	10594	21.4	11D	-B	1	V	1457	1.00	1.30		230	CH
CATA	23	1455E	1505D	1500	N12	W32	.603	10594	21.2	10D	-B			1500	.34	.44		234	
GRP28213	23	1544	1602	1546	S22	W55	.819	10581	19.5	18	-N				.86				3 3 3 3
SANM	23	1543	1610	1546	S20	W55	.817	10581	19.5	27	-N	1	C		.80	1.40			E
MCMA	23	1544	1605	1547	S23	W56	.829	10581	19.5	21	-N		C	1547	.52	.90			EK
MCMA	23	1544	1605	1547	S23	W56	.829	10581	19.5	21	-N		C	1547	.52	.90			EK
ZURI	23	1545	1550	1546	S22	W53	.800	10581	19.7	5	-N		C	1546	1.26	2.20			
214 SANM	23	1612	1621	1613	N12	W35	.639	10594	21.0	9	--F	1	C		.32	.41			D 3
GRP28215	23	1717	1736	1719	S22	W57	.837	10581	19.4	19	--F				.50				3 3 3 3
RAMY	23	1715	1738	1717	S24	W59	.856	10581	19.3	23	-F		C		.83				DE
SANM	23	1716	1735	1720	S20	W57	.835	10581	19.4	19	-F	1	C		.32	.59			EL
MCMA	23	1719	1735	1721	S23	W56	.829	10581	19.5	16	-F		C	1721	.36	.50			E
GRP28216	23	1742	1759	1743	N17	E42	.743	10595	26.9	17	--N				.67				3 3 3 3
RAMY	23	1741	1809	1743	N18	E41	.739	10595	26.8	28	-N		C		.83				DE
MCMA	23	1742	1755	1743	N17	E42	.743	10595	26.9	13	-N		C	1743	.52	.70			E
SANM	23	1742	1754	1744	N16	E42	.738	10595	26.9	12	-N	1	C		.65	.93			E
GRP28217	23	1846	1909	1850	N20	E20	.552	10592	25.3	23	--N				.71				2 2 2 3
RAMY	23	1845	1910	1851	N20	E20	.552	10592	25.3	25	-N		C		.93				DE
SANM	23	1847	1907	1849	N19	E20	.540	10592	25.3	20	-N	1	C		.48	.58			EL
GRP28218	23	1936	1947	1939	S22	W57	.837	10581	19.5	11	--F				.52				2 2 2 3
RAMY	23	1935	1949	1938	S21	W56	.827	10581	19.6	14	-F		C		.62				DF
MCMA	23	1936	1945	1939	S23	W58	.847	10581	19.5	9	-F		C	1939	.41	.80			E
GRP28219	23	1957	2008	2001	S12	W22	.378	10584	22.2	11	--F				.42				2 2 2 2
MCMA	23	1956	2005	2001	S12	W22	.378	10584	22.2	9	-F		C	2001	.31	.40			E
RAMY	23	1957	2011	2000	S12	W21	.363	10584	22.3	14	-F		C		.52				DE
GRP28220	23	2013	2038	2020	S06	E10	.174	10588	24.6	25	--N				.72				3 3 2 4
RAMY	23	2012	2045	2020	S06	E10	.174	10588	24.6	33	-N		C		1.13				DE
MCMA	23	2014	2035	2021	S07	E10	.172	10588	24.6	21	-N		C	2021	.31	.30			E
BOUL	23	2020E	2033	2020	S06	E10	.174	10588	24.6	13D	-N		S						
GRP28221	23	2127	2140	2129	N17	E42	.743	10595	27.0	13	--F				.57				2 2 2 3
MCMA	23	2127	2140	2129	N16	E42	.738	10595	27.0	13	-F		C	2129	.52	.70			E
RAMY	23	2128E	2129D	2128U	N18	E41	.739	10595	27.0	1D	-F		C		.62				DE
GRP28223	23	2154	2201	2156	N17	E42	.743	10595	27.1	7	-N				.73				3 3 2 4
RAMY	23	2154	2202D	2155	N18	E41	.739	10595	27.0	8D	-N		C		.83				DE
MCMA	23	2154	2200	2156	N16	E42	.738	10595	27.1	6	-N		C	2156	.62	.90			EV
BOUL	23	2155	2200	2156	N17	E42	.743	10595	27.1	5	-N		V						
224 CULG	23	2244	2312D	2249	N23	E13	.540	10592	24.9	28D	1N		P	2249	2.27	2.64			2
	23	2320	2328	NO FLARE PATROL															
	23	2358	0000	NO FLARE PATROL															
GRP28227	24	0300	0310	0303	N17	E42	.743	10595	27.3	10	-N				1.54				3 3 3 5
MANI	24	0259	0317	0303	N17	E42	.743	10595	27.3	18	1N	2		0303	2.48	3.65			
VORO	24	0300	0305	0302	N19	E43	.764	10595	27.4	5	-B		C	0302	.84	1.30		88	E
CRON	24	0300	0308	0303	N15	E43	.743	10595	27.4	8	-N		C		1.30	2.00			L
MANI	24	0306	0327	0310	N17	E39	.713	10595	27.1	21	-N	2		0310	.62	.94			
GRP28233	24	0857	0909	0858	N16	E41	.728	10595	27.4	12	1B				2.14				3 3 3 3
MANI	24	0855E	0913	0857	N16	E40	.718	10595	27.4	18D	1B	3		0857	1.86	2.54			
CRON	24	0855	0905	0857	N15	E43	.743	10595	27.6	10	-N		C		1.30	2.00			L
CATA	24	0900	0910	0900	N17	E39	.713	10595	27.3	10	1B			0900	3.25	4.67		302	
GRP28237	24	1221	1230	1224	N17	E32	.640	10595	26.9	9	-N				1.03				4 4 4 6
SANM	24	1219	1230	1222	N16	E31	.622	10595	26.8	11	-F	1	C		.32	.41			D
CAPE	24	1220	1229	1225	N17	E33	.650	10595	27.0	9	-N		C	1225	1.22	1.60			
RAMY	24	1221	1225D	1225U	N18	E32	.648	10595	26.9	4D	-N		C		1.24				DE
ABST	24	1222	1230	1225	N16	E32	.632	10595	26.9	8	-N		C	1225	1.35	1.70			D

Note:
A line of explanation has been added before each flare event having more than one maxima. The total number of stations reporting some part of the event is given. The number of stations observing at the time of the principal maximum but not reporting the event is given in the second statement. Care should be exercised in utilizing the numbers in the remarks column. The first number is the number of stations reporting the individual maximum, and not the total number of stations reporting some part of the flare event. The last number is the number of stations reporting at the time of the individual maximum and not necessarily the total number of stations observing during the flare event. GRP numbers may appear several times in order to indicate secondary maxima. An asterisk beside an importance indicates a secondary maximum. The word "GRP" has also been omitted to aid in pointing to this condition.
When it is impossible to determine the time of Maximum Phase from the individual reports the time of Area Measurements is used. This time appears in parentheses. For Flares reported by only one station the last 3 digits of the group number appear to the left of the station code.

"Remarks":

A = Eruptive prominence, base at >90°.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No spots visible in the neighborhood.
H = Flare with high velocity dark surge.
I = Very extensive active region.
J = Plage with flare shows marked intensity variations.
K = Several intensity maxima.
L = Filaments show effects of sudden activation.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H or K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line.
S = Brightening follows disappearance of filament (same position).
T = Region active all day.
U = Close and somewhat parallel bright filaments (|| or Y shape).
V = Occurrence of an explosive phase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα emission.
Y = Onset of a system of loop-type prominences.
Z = Major sunspot umbra covered by flare.

In the importance column "--" signifies the subflare has been confirmed by the ESSA grouping program but is not included in the I.A.U. Quarterly Bulletin on Solar Activity nor are these subflares included in the Flare Index below.

DAILY FLARE INDICES

Date	Flare Index	HR OBS
700201	15.16	24.0
700202	110.71	24.0
700203	2.03	24.0
700204	38.50	24.0
700205	0.85	23.5
700206	57.94	22.9
700207	30.53	24.0
700208	79.85	24.0
700209	140.69	24.0
700210	122.67	23.9
700211	726.24	24.0
700212	416.35	22.1
700213	114.29	24.0
700214	165.53	24.0
700215	39.79	23.7
700216	118.29	24.0
700217	85.80	24.0
700218	114.47	24.0
700219	230.47	24.0
700220	487.40	24.0
700221	230.57	23.2
700222	110.47	23.8
700223	73.11	23.8
700224	46.37	24.0
700225	104.94	23.2
700226	34.08	24.0
700227	123.59	24.0
700228	44.05	24.0

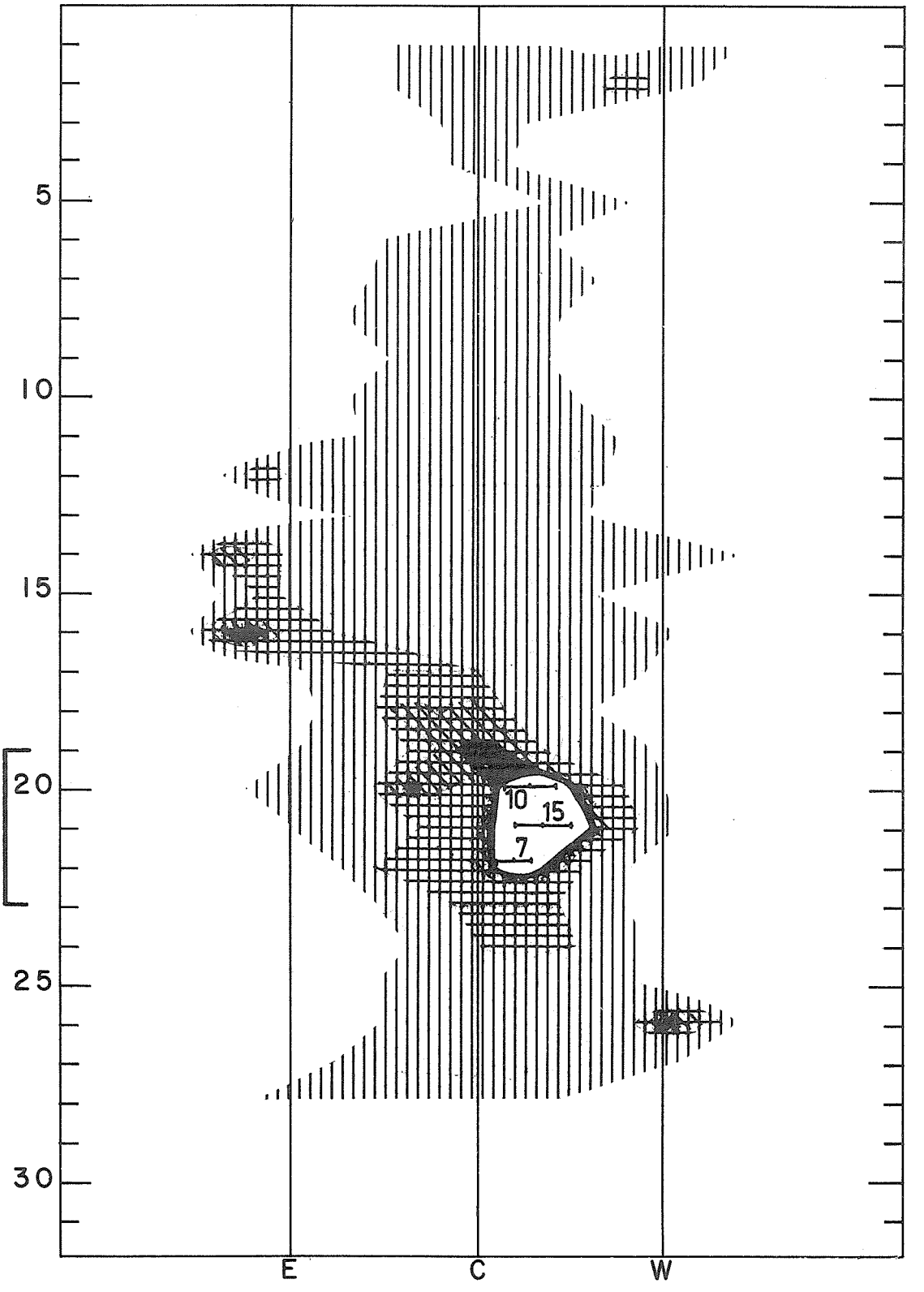
When no Flare Index is given, it is 0 for that day.

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

FEBRUARY 1970

Nançay

169 MHz

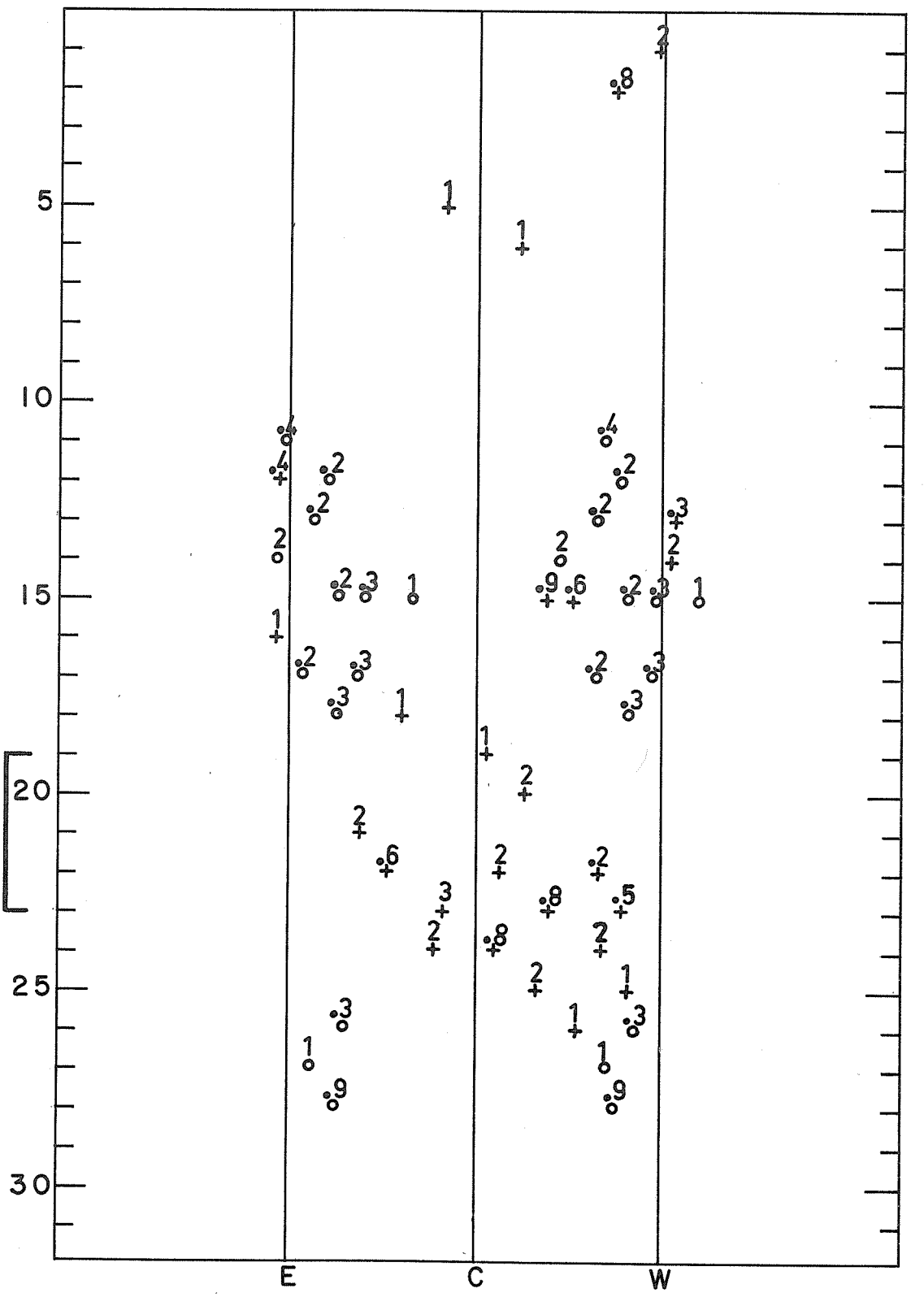


SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

FEBRUARY 1970

Nançay

408 MHz



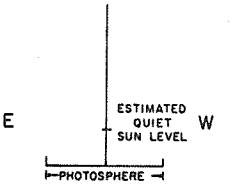
Because of the distance between the main lobes there is sometimes an ambiguity about the position East or West of the Center of Activity. The two possible positions are indicated by circles on the chart.

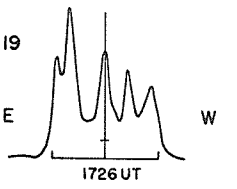
EAST-WEST SOLAR SCANS

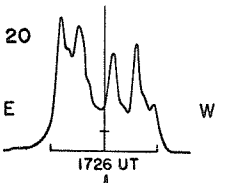
FEBRUARY 1970

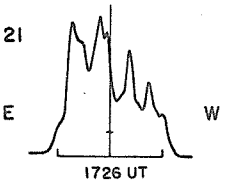
ALGONQUIN RADIO OBSERVATORY
CANADA

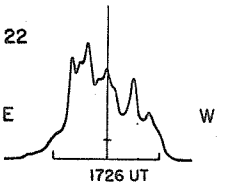
10.7 cm
Fan-Beam with 1.5 minutes of arc
E-W Resolution

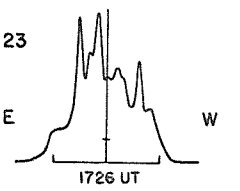


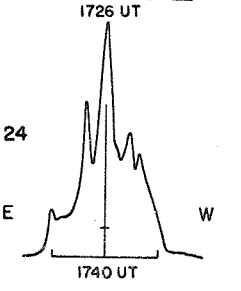






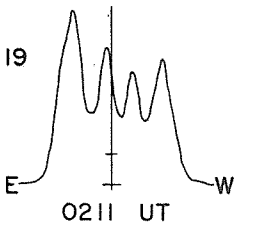


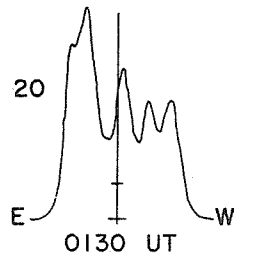


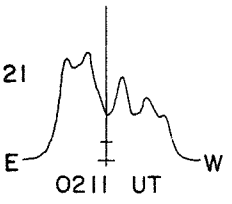


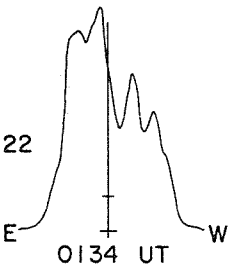
Fleurs, Australia

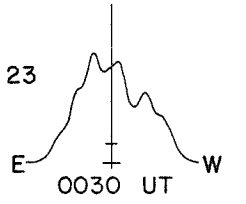
21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution

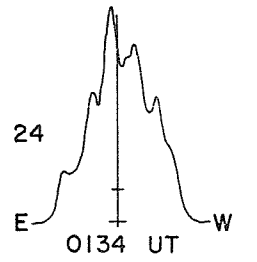




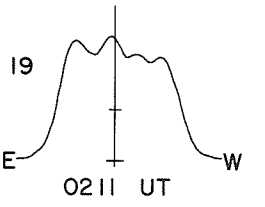


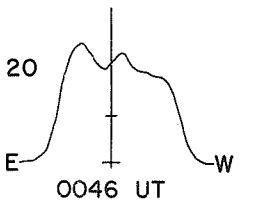


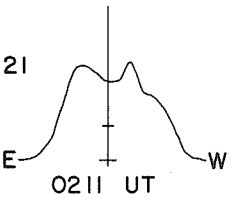


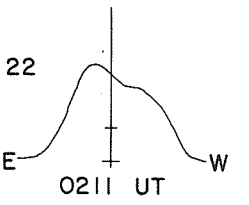


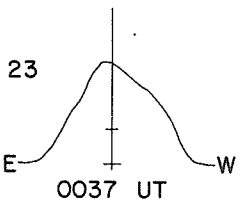
43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution

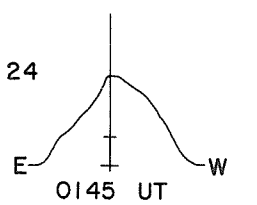












SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

FEBRUARY 1970

FEB 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
18	200	HIRA	45	0420	0420	3	70.0	10.0		
	3750	TYKW	5	0428	0431.6	13	125.0	30.0		
	9620	IRKU	3	0429	0431.6	9	77.0	28.5		
	9400	TYKW	5	0429	0431.8	5	73.0	25.0		
	2000	TYKW	5	0429	0431.7	12	58.0	18.0		
	8800	MANI	3	0430.5	0431.3	8.8	91.5	38.0		
	4995	MANI	3	0430.5	0431.3	8.8	160.0	72.0		
	2695	MANI	3	0430.5	0431.3	8.3	100.8	48.0		
	1415	MANI	3	0430.5	0431.3	3.1	7.7	3.3		
	9400	TYKW	29	0434		170	27.0	18.0		
	3750	TYKW	29	0441		160	16.0	6.0		
	2000	TYKW	29	0441		150	6.0	3.0		
	100	GORK	44	0518 E		462 D		15.0		
	200	GORK	44	0556		300		5.0		
	221	ABST		0600	0744.3	180	63.0			
	200	HIRA	45	0603	0603.5	1	135.0	35.0		
	204	KIEV	42	0700 E		420	72.0	9.0		
	200	GORK	6	0737.8	0738.6	1	200.0			
	100	GORK	6	0738.1	0738.5U	.9	25.0D			
	9400	TYKW	5	0744	0744.5	2	8.0	3.0		
	9100	GORK	1	0744.3	0744.8	1.5	12.0	5.5		
	3750	TYKW	5	0744	0744.5	2	6.0	2.0		
	2950	GORK	1	0744.1	0744.8	1.7	6.5	2.9		
	2000	TYKW	5	0744	0744.5	1	10.0	3.0		
	650	GORK	1	0744.1	0744.8	3.2	1.0	0.7		
	237	TRST	45	0744.3	0744.4	.6	180.0			
	200	GORK	6	0744.5	0744.7	1.1	400.0D			
	100	GORK	6	0744.5	0744.8	.8	25.0			
	600	UCCL	4	0859.5	0908	52.5	18.0	3.0		
	234	POTS	45	0902.4	0902.5	.1	250.0	80.0		
	237	TRST	41	0917.6	0917.7	.7	960.0			
	234	POTS	45	0917.7	0917.7	.2	450.0	50.0		
	200	GORK	6	0917.7	0917.8	.7	360.0D			
	100	GORK	41	0917.3	0917.8	10	25.0			
	9500	BERL	20	0918.1E	0918.1		5.2			
	1490	NEUS	1	0918.3E	0918.3		2.3			
	200	GORK	6	1055.4	1055.5	.5	50.0	15.0		
	100	GORK	6	1055.4	1055.6	.5	25.0D			
	237	TRST	45	1135	1135.1	.3	150.0	40.0		
	600	UCCL	4	1240	1245	20	14.0	4.0		
	408	SANM	40	1245		40				
	606	SGMR	20	1257.7	1305	10.5	4.0	1.5		
	8800	SGMR	3	1258.7	1259.5	7.1	15.6	7.0		
	4995	SGMR	3	1258.6	1259.6	4.4	8.6	4.0		
	2695	SGMR	1	1258.2	1259.6	5.2	6.7	3.0		
	1490	NEUS	4	1258.8	1259.3	1.5	8.4	3.8		
	1415	SGMR	3	1258.1	1259	4.6	11.9	5.0		
	200	NERA	45	1258.8	1259.3	2.7	205.0	75.0		
	100	GORK	48	1258.6	1259.8	2.2	1000.0			
	15400	SGMR	3	1259	1259.4	3.4	19.1	9.0		
	9500	NERA	5	1259.1	1259.6	1.4	6.0	3.0		PERCENT INC.
	9500	BERL	22	1259.5E	1259.5		17.0			
	3000	NERA	5	1259.2	1259.6	2.4	11.0	5.0		
	408	SANM	45	1259	1301.3	3.2	58.0	18.0		
	245	SGMR	48	1259	1259.6	2.3	540.0	28.8		
	237	TRST	45	1259	1259.5	1	1250.0	450.0		
	234	POTS	45	1259	1259.4	.7	550.0	100.0		
	225	HARS	5	1259	1259.5	1.5	180.0D	100.0		
	200	GORK	6	1259.1	1259.4U	.9	270.0D			
	111	POTS	45	1259	1259.4	.8	1000.0	200.0		
	23	POTS	5	1259.3	1259.7	2	12000.0	4000.0		
	600	UCCL	4	1331 U		24				
	9400	HUAN	20	1505.1	1517.5	49.9	6.8	3.7		
	2800	OTTA	20	1700	1707	10	2.2	1.1		
	2800	OTTA	23	1750	1805	160	12.0	5.0		
	4995	SGMR	20	1757.5	1805.3	28.8	33.6	8.0		
	2695	SGMR	20	1802.5	1805.4	26.7	7.0	2.0		
	15400	SGMR	20	1803.3	1805.1	15.9	12.2	3.5		
	8800	SGMR	20	1803.3	1806	27.1	9.6	3.0		
	10700	PENN	20	1804.1	1806	24.9	6.8	2.6		
	2700	PENN	1	1804.1	1805.5	2.9	9.1	4.6		
	960	PENN	8	1804.5	1804.5	.2	360.0D			
	2800	OTTA	20	1850	1900	20	3.2	1.6		
	2800	OTTA	22	2120	2135	40	7.2	3.6		
19	100	HIRA	45	0112.5	0113	1	260.0D	50.0D		
	3750	TYKW	5	0252	0253.6	13	4.0	2.0		
	2000	TYKW	5	0252	0253.6	3	5.0	2.0		
	9620	IRKU	3	0322	0328	11	60.0	25.0		
	3750	TYKW	5	0322	0327.9	9	112.0	40.0		
	9400	TYKW	5	0323	0328	8	55.0	28.0		
	2000	TYKW	5	0324	0328	15	56.0	13.0		
	8800	MANI	4	0325.8	0327.8	10	42.5	14.2		
	4995	MANI	4	0325.8	0327.8	11	114.0	53.2		
	2695	MANI	4	0325.8	0327.8	11	96.0	45.6		
	1415	MANI	4	0325.8	0327.8	11	18.0	7.2		
	1000	TYKW	5	0327	0328	3	4.0	2.0		
	9400	TYKW	29	0331		120	28.0	14.0		
	3750	TYKW	29	0331		150	29.0	10.0		
	100	GORK	44	0523 E		450 D		10.0		

↕ indicates large bursts or bursts at times of ≥1F flares.

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

FEBRUARY 1970

FEB 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
19	221	ABST		0600	0705.4	180	35.0			
	100	GORK	41	0537.7	0538	1.1	30.0			
	200	GORK	6	0538	0538.2	1	300.0	80.0		
	100	GORK	6	0618.2	0618.4U	.9	30.0D			
	200	GORK	6	0620.4	0620.7	.7	10.0	5.0		
	200	GORK	6	0644	0644.4	.7	70.0	20.0		
	100	GORK	6	0644	0644.4	1.3	40.0	15.0		
	100	GORK	6	0654.2	0654.4	.5	35.0	10.0		
	200	GORK	6	0708.8	0708.9	.2	40.0	15.0		
	100	GORK	6	0708.8	0709	.5	40.0	15.0		
	100	GORK	6	0732	0733 U	1.7	40.0D			
	9100	GORK	20	0741.1	0743.5	8.5	25.0	10.5		
	2950	GORK	20	0743.7	0748.4	9.8	6.4	4.8		
	204	KIEV	41	0800.6	0806	10.8	78.0D			
	202	IZMI	42	0801	0805.9	130	1160.0			
	200	NERA	40	0805.8	0805.9	5.6	230.0			
	100	GORK	41	0805.4	0806.3	6.3	450.0			
	100	GORK		0805.4	0811.1		40.0			
	930	BORD	45	0806	0806.3	1	455.0	2.0		
	237	TRST	42	0809	0810.8	2	1680.0			
	930	BORD	45	0810	0811.2	2	22.0	2.0		
	650	GORK	4	0810.6	0811	1.5	16.5			
	234	POTS	40	0810.8	0810.8	.2	400.0	80.0		
	200	GORK	41	0810.2	0810.9	.7	300.0			
	2950	GORK	20	0841.3	0842.8	18.8D	10.0			
	9100	GORK	20	0842	0844	12	20.0	15.0		
	930	BORD	5	0901	0901.8	1	44.0	1.0		
	237	TRST	45	0901.4	0901.5	.2	630.0	150.0		
	204	KIEV	6	0901.3	0901.5	.4	60.0			
	1490	NEUS	20	0914.7	0934.7	71	3.8	2.0		
	204	KIEV	6	0921.6	0921.9	.6	78.0			
	204	KIEV	6	0929.5	0930.4	1.6	78.0			
	9500	BERL	20	0930.7	0936.2	53	18.0	6.8		
	3000	NERA	27	0930	0935	65	16.0	8.0		
	9100	GORK	20	0933.8	0937	11.2	21.7	10.8		
	2950	GORK	20	0933.8	0935.5	9.5	11.1	7.4		
	204	KIEV	6	0939.7		.7	78.0D			
	650	GORK	1	0951.7	0951.8	.4	2.4	1.8		
	600	UCCL	1	0951.8		.5	3.0	1.0		
	237	TRST	42	0951.6	1009.8	18.7	1350.0			
	234	POTS	45	0951.7	0951.8	.2	175.0	30.0		
	200	GORK	6	0951.7	0952	.4	250.0D			
	111	POTS	45	0951.7	0951.8	.4	1400.0	300.0		
	100	GORK	6	0952.4	0952.8	.9	45.0			
	650	GORK	3	1000.3	1000.6	.6	25.0	12.0		
	600	UCCL	8	1000.3		.4	42.0	20.0		
	200	GORK	6	1000.1	1000.3	.6	270.0D			
	111	POTS	45	1000.1	1000.2	.3	1000.0	150.0		
	100	GORK	6	1000	1000.3U	1.1	40.0D			
	234	POTS	45	1009.8	1009.8	.3	700.0	35.0		
	200	GORK	6	1009.5	1009.9	.5	260.0			
	111	POTS	40	1009.8	1009.8	1.7	13000.0	650.0		
	600	UCCL	1	1010		.3	10.0	5.0		
	100	GORK	41	1010.3	1011.1	1.9	1500.0			
	23	POTS	45	1010	1010	.3	4000.0	1000.0		
	2950	GORK	1	1047.6	1049	5.3	7.2	2.6		
	9100	GORK	1	1048	1049	1.9	10.6	5.0		
	3000	NERA	5	1048.3	1048.6	1.7	4.0	2.0		
	650	GORK	1	1053.1	1053.4	.7	3.3	1.6		
	9100	GORK	20	1110	1117.3	10.7	10.6	4.7		
	2950	GORK	20	1110.6	1115	6.2	6.1	4.6		
	204	KIEV	43	1200	1350	120 D	64.0	13.0		
	245	SGMR	48	1345.9	1350.3	9.6	710.0	3.9		
	200	NERA	45	1348.8	1350.5	2	125.0	60.0		
	2800	OTTA	1	1349	1350	2	2.8	1.4		
	610	NERA	45	1349	1349.5	1.8	25.0	10.0		
	606	SGMR	40	1349.1	1350.5	6.1	10.6	3.3		
	600	UCCL	4	1349	1350	2.5	17.0	9.0		
	237	TRST	42	1349.1	1350.4	12.6	4800.0			
	234	POTS	40	1349.2	1350.3	1.3	550.0	4.0		
	111	POTS	45	1349.2	1349.4	1.8	1200.0	75.0		
	600	UCCL	4	1352.5	1353	2.5	16.0	6.0		
	930	BORD	45	1401	1401.7	1	13.0	2.0		
	600	UCCL	8	1401.4		.6	45.0	23.0		
	18	MCMA	41	1453	1456	12			1	
	245	SGMR	44	1500		401 D				
	408	SANM	43	1640	1809.3	150	68.5	19.5		
	2800	OTTA	4	1507	1510.5	9	13.0	3.6		
	8800	SGMR	20	1508.1	1510.2	9.2	17.3	8.2		
	4995	SGMR	20	1508.2	1510.5	9.2	25.2	12.5		
	3000	NERA	45	1508.4	1510.4	5	17.0	8.0		
	2695	SGMR	20	1508.5	1510.4	15	12.4	6.2		
	15400	SGMR	1	1509.8	1510.5	1.6	4.1	2.0		
	1415	SGMR	1	1509.9	1510.1	1.1	7.0	3.5		
	9400	HUAN	1	1534.2	1534.7	7	22.0	7.0		
	9400	HUAN	23	1629	1657.1	26 U	20.3	7.0		
	9400	HUAN	1	1642.6	1644	3.4	25.7	10.0		
	2800	OTTA	2	1712.8	1713	1	6.6	3.3		
	2700	PENN	41	1712.9	1716.6	¼	11.3			
	960	PENN	45	1713	1713.2	1.1	30.2	1.5		

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FEB 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	9400	HUAN	20	1727.5	1731.4	22.5	9.0	5.9		
	4995	SGMR	20	1750.8	1759.9	20.2	6.7	3.3		
	2800	OTTA	20	1750	1805	25	2.2	1.6		
	8800	SGMR	20	1752.7	1800	18.4	3.4	1.7		
	15400	SGMR	20	1753	1757.5	15.9	8.3	4.1		
	2800	OTTA	20	1910	1930	45	3.2	1.6		
	9400	HUAN	4	2042.6	2044.3	3.4	27.1	10.6		
	4995	MANI	3	2322.3	2323.8	3.7	28.8	14.4		
	3750	TYKW	5	2322	2323.8	4	35.0	8.0		
	2695	PENT	3	2322	2323.5	7	38.0	9.4		
	2695	MANI	4	2322.3	2323.8	3.7	33.6	14.4		
	1415	MANI	1	2322.3	2323.8	3.7	3.2	1.6		
	9400	TYKW	5	2323.5	2323.8	8	8.0	3.0		
	2000	TYKW	5	2323	2323.8	2	15.0	5.0		
	606	MANI	2	2323.2	2323.5	1	6.5	3.2		
20	200	HIRA	45	0355	0355.5	1.5	75.0	10.0		
	3750	TYKW	5	0418	0419.4	25	11.0	4.0		
	100	GORK	44	0506 E		483 D		10.0		
	221	ABST		0600	0607	180	37.0			
	650	GORK	20	0622.2	0747.1	111	3.8	1.7		
	204	KIEV	42	0700 E		420	24.0	6.0		
	200	GORK	6	0607.3	0607.4	.2	80.0	30.0		
	200	GORK	6	0614.8	0615.1	.5	25.0	10.0		
	9100	GORK	1	0645	0645.8	4.1	8.3	4.0		
	4995	MANI	1	0646.5	0647.8	4	3.1	1.2		
	3750	TYKW	5	0646	0647.5	4	7.0	2.0		
	2950	GORK	1	0646.8	0648	4.2	11.4	4.4		
	2695	MANI	3	0646.5	0647.8	4	14.0	6.0		
	2000	TYKW	5	0646	0647.6	4	6.0	2.0		
	1415	MANI	1	0646.5	0647.8	4	5.2	2.0		
	200	GORK	6	0646.6	0646.7	.2	20.0	10.0		
	200	GORK	6	0655	0655.1	.2	25.0	12.0		
	200	GORK	41	0709.2	0709.7	1.1	30.0			
	9100	GORK	1	0734.5	0737	2.9	12.4	4.2		
	2950	GORK	1	0737.8	0739.3	2.7	3.7	2.2		
	3000	NERA	45	0751.8	0752.8	1.1	11.0	6.0		
	2950	GORK	1	0751.6	0752.2	3.1	13.9	5.4		
	200	GORK	41	0752	0752.8	1.1	40.0			
	930	BORD	45	0842	0847	9	27.0	6.0		
	650	GORK	20	0856.5	0920.3	32.4	3.4	1.7		
	9100	GORK	3	0912.6	0914.4	2.8	243.0	123.0		
	9100	GORK	29	0916	0916.8	131	120.0	49.0		
	650	GORK	20	0940	0947.1	10.2	3.5	1.8		
	9500	NERA	5	0942.7	0944.2	2.6	65.0	30.0		PERCENT INC.
	9500	BERL	4	0942	0943.7	236 U	153.0	17.0		
	9400	SLOU	3	0942.9	0944	2.5	220.0			
	3000	NERA	5	0942.6	0944	3	400.0	200.0		
	2950	GORK	46	0942.1	0944.2	114.3	5800.0			
	2950	GORK	46	0942.1	0943.3	6.9	82.0			
	2950	GORK		0942.1	0944.2		580.0			
	1490	NEUS	4	0942	0946.5	248 U	65.0	5.4		
	950	GORK	3	0942.9	0947.2	8.4	32.0	10.2		
	19000	SLOU	3	0943	0944.5	3 U	56.5			
	2800	SLOU	47	0943	0944.4	11	546.0			
	1420	KIEL	5	0943	0948	10	100.0	40.0		
	808	ONDR	45	0943.5	0944.5	8.5				
	9500	NERA	29	0945.3		185	30.0	15.0		PERCENT INC.
	9400	SLOU	29	0945.5	0945.5	180 U	104.0			
	3000	NERA	29	0945.6		220	185.0	90.0		
	2950	GORK	29	0948.8	0957.8	108.4	53.0	27.3		
	1420	KIEL	29	0953			10.0			
	2800	SLOU	29	0954	0954	190	29.5			
	111	POTS	45	0950.4	0951.5	1.5	300.0	6.0		
	100	GORK	6	0952.7	0953.6U	1.3	700.0			
	111	POTS	45	1026.3	1026.7	.9	300.0	15.0		
	234	POTS	45	1030	1430 U		70.0U			
	200	GORK	41	1044.5	1045	1.2	30.0			
	600	UCCL	22	1045	1125	57	10.0			
	650	GORK	20	1046	1054.2	16.8	2.4	1.2		
	420	KIEL	6	1046	1056	12	25.0	10.0		
	650	GORK	20	1119.8	1124.9	9.5	3.6	1.8		
	111	POTS	45	1119.9	1120	.2	250.0	50.0		
	650	GORK	20	1142.5	1155.1	16.4	3.3	1.6		
	245	SGMR	43	1230		555 D				
	111	POTS	45	1231.7	1233.3	2	200.0	10.0		
	234	POTS	40	1323.4	1324.8	1.4	200.0	5.0		
	2800	OTTA	20	1340	1420	65	3.6	1.8		
	600	UCCL	22	1400 U	1432.5	180 D	10.0			
	606	SGMR	22	1402	1432.5	42.2	6.5	3.2		
	237	TRST	45	1425.8	1426	.4	420.0	120.0		
	234	POTS	45	1425.8	1426	.3	125.0	30.0		
	200	NERA	45	1425.8	1426	1	375.0	175.0		
	2800	OTTA	24	1455		30	10.6			
	536	ONDR	45	1455	1455.5	2	190.0			
	4995	SGMR	22	1714.6	1719.5	32.9	25.8	12.9		
	2800	OTTA	21	1715	1740	105	7.0	3.8		
	2695	SGMR	20	1715.5	1719.7	28.3	8.9	4.5		
	1415	SGMR	20	1715.3	1719.5	9.4	4.6	2.3		
	15400	SGMR	20	1717.5	1719.7	25.3	8.5	4.3		

SOLAR RADIO EMISSION
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FEB 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	4	1717.5	1719.5	9	10.2	5.1		
	8800	SGMR	20	1718.7	1719.5	34.8	8.8	4.4		
	2800	OTTA	24	1905		55	6.4			
	100	HIRA	44	2125 E		395 D				INT
	9400	TYKW	5	2330	2333	6	14.0	7.0		
	8800	MANI	3	2330.5	2333.8	7	23.5	9.8		
	3750	TYKW	5	2330	2333.5	10	30.0	14.0		
	2000	TYKW	5	2330	2333.5	12	23.0	9.0		
	4995	MANI	3	2331.5	2333.8	6	29.4	11.8		
	2695	MANI	3	2331.5	2333.8	6	30.3	12.1		
	1415	MANI	1	2331.5	2333.8	6	5.2	2.0		
	9400	TYKW	29	2336		120	7.0	4.0		
	3750	TYKW	29	2340		120	8.0	4.0		
	2000	TYKW	29	2342		120	6.0	3.0		
21	9400	TYKW	5	0158	0158.7	2	9.0	3.0		
	8800	MANI	1	0158.6	0158.9	1.3	4.0	4.0		
	4995	MANI	3	0158.6	0158.9	1.3	8.8	2.9		
	3750	TYKW	5	0158	0158.8	2	3.0	1.0		
	2695	MANI	3	0158.6	0158.9	1.3	10.1	4.0		
	2000	TYKW	5	0158	0158.8	2	6.0	2.0		
	1415	MANI	1	0158.6	0158.9	1.3	3.9	1.3		
	9400	TYKW	5	0408	0408.5	1	5.0	2.0		
	3750	TYKW	5	0408	0408.5	2	5.0	1.0		
	2000	TYKW	5	0408	0409	2	2.0	1.0		
	200	GORK	44	0512 E		108		5.0		
	100	GORK	44	0512 E		114		8.0		
	221	ABST		0600	0639.1	180	15.0			
	100	GORK	44	0706		249		5.0		
	100	GORK	41	0815.5	0816.2	1.2	40.0			
	200	GORK	6	0816	0816.1	.2	35.0	15.0		
	111	POTS	5	0816	0816.1	.1	2000.0	700.0		
	2950	GORK	4	0939.8	0943	5.9	10.3	3.4		
	3000	NERA	5	0941.8	0942.9	1.4	7.0	3.0		
	234	POTS	5	0941.5	0941.5	.1	100.0	30.0		
	100	GORK	6	1108.1	1108.2	.2	40.0	15.0		
	100	GORK	44	1115		42 D		7.0		
	111	POTS	45	1116 U	1306 U		1500.0U			
	204	KIEV	44	1235	1358 U	85 D	78.0D	15.0		
	245	SGMR	43	1259.9		527.1D				
	2800	OTTA	1	1302.5	1304	5	5.4	1.8		
	3000	NERA	5	1303	1303.8	2	7.0	4.0		
	600	UCCL	4	1429	1514	72	90.0	35.0		
	2800	OTTA	21	1430	1506	210	11.4	6.4		
	420	KIEL	48	1430	1508	70	150.0	70.0		
	240	KIEL	48	1430	1508	75	130.0	40.0		
	606	SGMR	22	1434.3	1514.2	66.5	77.0	33.0		
	408	SANM	27	1435	1515	110	380.0	48.0		
	610	NERA	45	1450	1514	40	75.0			
	930	BORD	27	1457	1502.7	23	29.0	4.0		
	3000	NERA	45	1502	1511.4	14	50.0	15.0		
	2800	OTTA	4	1502	1502.5	1	7.4	3.7		
	9400	HUAN	22	1508.8	1511.8	21.8	5.6	2.9		
	2800	OTTA	8	1535	1535.4	.5	30.0			
	2800	SLOU	3	1535	1535.1	.5	34.4			
	2700	PENN	5	1535.2	1535.4	.5				
	960	PENN	45	1535.1	1535.3	.5	13.0	1.5		
	930	BORD	45	1535	1535.4	1	65.0	2.0		
	1420	KIEL	5	1600	1604	10	650.0	100.0		
	420	KIEL	6	1600	1604	10	35.0	15.0		
	240	KIEL	6	1600	1604	10				
	4995	SGMR	20	1605.7	1613.4	12.6	15.6	7.0		
	2695	SGMR	45	1605.5	1613	11.8	39.5	9.8		
	1415	SGMR	47	1605.7	1612.8	17.4	1210.0	130.0		
	960	PENN	45	1605.6	1612.7	15 D	260.0D			
	606	SGMR	20	1605.5	1612.1	14.5	30.8	15.0		
	18	MCMA	41	1605	1612	8			1	
	2700	PENN	45	1606.6	1613.1	15 D				
	2800	OTTA	4	1608.5	1613	10	50.0	15.0		
	2800	SLOU	46	1608.5	1612.4	9 U	69.4			
	930	BORD	45	1609	1613	11	250.0	35.0		
	3000	NERA	45	1610	1613	7	40.0	15.0		
	8800	SGMR	20	1611.1	1613.1	9	5.8	2.5		
	600	UCCL	3	1611	1612	6.5	27.0	10.0		
	2800	OTTA	21	1815	1900	105	5.8	2.9		
	2800	OTTA	21	1815	1822	30	2.8			
	2800	OTTA	21	1845	1900	75	5.8			
	1415	SGMR	20	1845.1	1852.8	36.1	6.0	2.5		
	15400	SGMR	20	1847.6	1853.5	27.8	10.4	3.5		
	2700	PENN	20	1847.8	1853.4	19				
	4995	SGMR	20	1848	1853.4	46.2	25.2	7.0		
	8800	SGMR	20	1849.9	1853.2	50.7	13.3	4.0		
	2800	OTTA	1	1850	1853	6	9.0	4.2		
	2695	SGMR	20	1850.1	1853.5	31.8	8.1	3.0		
	408	SANM	45	1936.3	1937.3	1.7	24.0	6.0		
	2800	OTTA	22	2115	2125	35	3.0	1.5		
	245	SGMR	6	2121	2122.8	7.2	31.8	2.4		
	606	SGMR	1	2123	2123.3	.8	2.3	.8		
	606	SGMR	4	2135.7	2137.6	4	46.5	11.3		
	100	HIRA	45	2136.5	2137.5	3	250.0D	50.0D		

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FEB 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	245	SGMR	6	2138	2138.3	1	215.0	7.2		
	500	HIRA	45	2235.4	2235.4	.5	230.0	140.0		
22	3750	TYKW	5	0113	0113.2	1	3.0	1.0		
	2000	TYKW	5	0113	0113.4	1	2.0	1.0		
	1000	TYKW	45	0318	0319.2	2	8.0	3.0		
	100	GORK	44	0512		372		5.0		
	2950	GORK	4	0741.8	0742.8U	6	34.0D			
	1490	NEUS	3	0741.5	0742.5	3 U	22.0U	5.6		
	4995	MANI	4	0742.6	0742.9	1.3	20.0	8.5		
	3750	TYKW	45	0742	0743	6	21.0	6.0		
	3000	NERA	45	0742.4	0743	3.5	33.0	12.0		
	2695	MANI	4	0742.6	0742.9	1.3	36.9	14.4		
	2000	TYKW	45	0742	0743	6	28.0	7.0		
	1415	MANI	4	0742.6	0742.9	4.3	21.4	8.8		
	1000	TYKW	5	0742.5	0743	5	13.0	5.0		
	950	GORK	3	0742.7	0743.2	5.5	14.4	6.2		
	650	GORK	4	0742.7	0744.1	3.1	59.0			
	111	POTS	45	0822.6	0822.7	.3	300.0	60.0		
	2950	GORK	40	0827.8	0828	.5	7.9			
	8800	MANI	3	0857.7	0858.4	1	30.9	11.6		
	4995	MANI	3	0857.7	0858.4	1	11.4	5.7		
	2695	MANI	1	0857.7	0858.4	1	6.2	2.1		
	9500	BERL	3	0858 E	0858		10.0			
	9100	GORK	1	0858.3	0858.6	.9	11.6	6.0		
	100	GORK	6	0858.1	0858.5	.7	45.0			
	100	GORK	41	0909.1	0909.4	10.5	45.0			
	237	TRST	42	0914.3	0917.9	5.5	115.0			
	100	GORK	6	0927.7	0927.8	.3	45.0	20.0		
	2950	GORK	1	0938.1	0939.9	4.5	8.9	3.9		
	100	GORK	41	0945.6	0945.9	12.5	45.0			
	100	GORK		0945.6	0951.4		45.0			
	100	GORK		0945.6	0957.3		45.0			
	204	KIEV	44	1040	1345	210 D	51.0	12.0		
	1490	NEUS	20	1135	1138.3	25 U	4.0	1.6		
	9500	BERL	1	1337.2	1338.3	1.3	9.4	3.6		
	15400	SGMR	1	1338.6	1338.7	1.7	5.9	2.2		
	8800	SGMR	1	1338.5	1338.8	3.5	4.6	2.0		
	4995	SGMR	1	1338.5	1338.9	3	7.0	3.0		
	3000	NERA	5	1338.5	1338.9	1.5	4.0	2.0		
	2695	SGMR	1	1338.5	1339	1.9	3.2	1.5		
	1490	NEUS	4	1338	1338.5	1.2	5.3	1.2		
	1415	SGMR	1	1338.1	1338.8	1.5	4.3	2.0		
	2800	OTTA	20	1610	1635	50	2.8	1.4		
	9400	HUAN	1	1735	1737.5	5.6	7.9	4.0		
	2800	OTTA	20	1830		145	3.4	2.8		
	9400	HUAN	4	1921.7	1922	23.9	19.2	7.2		
	200	HIRA	45	2205	2205	1.5	420.0	45.0		
	2695	PENT	1	2358	2359	2	2.6	1.3		
23	208	VORO	45	0013	0014	2	170.0	68.0		
	100	HIRA	45	0013	0014	3	350.0D	100.0D		
	200	HIRA	45	0023	0024.5	2	100.0	40.0		
	3750	TYKW	5	0208	0209.7	3	10.0	4.0		
	9620	IRKU	3	0209	0209.7	2	21.0	10.0		
	9400	TYKW	45	0209	0209.7	3	20.0	7.0		
	8800	MANI	4	0209.3	0209.5	1.7	15.4	3.8		
	4995	MANI	4	0209.3	0209.5	1.7	19.2	8.2		
	2695	MANI	1	0209.3	0209.5	1.7	4.0	2.0		
	3750	TYKW	29	0211		15	4.0	2.0		
	9400	TYKW	29	0212		15	6.0	3.0		
	500	HIRA	45	0304	0304.7	.5	630.0	350.0		
	200	HIRA	45	0325.5	0326	1	140.0	50.0		
	100	HIRA	45	0325.5	0326	1.5	350.0D	50.0D		
	3750	TYKW	5	0356.5	0357.2	1.5	3.0	1.0		
	500	HIRA	45	0406	0406.4	.6	90.0	40.0		
	200	HIRA	45	0406	0406	1	60.0	10.0		
	221	ABST		0600	0712.4	180	23.0			
	200	HIRA	45	0712	0712.5	1.5	130.0	10.0		
	111	POTS	45	0712.6	0712.8	.7	1500.0	200.0		
	100	HIRA	45	0712	0712.5	2	350.0D	20.0D		
	100	GORK	48	0712.5	0713.2	1.7	3000.0			
	100	GORK	41	0717.7	0717.9	4.2	950.0			
	100	GORK		0717.7	0721		100.0			
	100	GORK	6	0957.9	1000.2	.5	25.0			
	600	UCCL	8	1052		.3	40.0	15.0		
	100	GORK	41	1052.9	1053.3	2	13.0			
	100	GORK		1052.9	1054.8		6.0			
	100	GORK	6	1122.6	1122.8	.4	12.0	6.0		
	930	BORD	40	1136	1136.5	2	19.0	2.0		
	234	POTS	45	1147.8	1148.6	1	250.0	8.0		
	600	UCCL	8	1159.3		.2	36.0	12.0		
	9400	HUAN	20	1327.2	1344.7	35.1	11.3	4.1		
	2800	OTTA	1	1409	1409.5	1.5	2.8	1.2		
	930	BORD	45	1455	1455.2	1	28.0	2.0		
	600	UCCL	4	1455	1455.3	2.3	110.0	35.0		
	600	UCCL	1	1522.5	1522.7	.5	10.0	5.0		
	237	TRST	42	1522.2	1522.5	1.1	990.0			
	237	TRST	5	1535.5	1535.6	.2	130.0	40.0		
	2800	OTTA	25	1540		10	3.4			

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

FEBRUARY 1970

FEB 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
	A									
	2800	OTTA	1	1544	1544.7	4	7.6	2.8		
	600	UCCL	8	1544.5		.3	30.0	10.0		
	9400	HUAN	20	1546.1	1551.5	18.7	9.2	4.8		
	600	UCCL	8	1557.8		.2	15.0	8.0		
	18	MCMA	6	1626	1628	3			1	
	9400	HUAN	20	1631.3	1641.5	18.7	11.1	5.8		
	9400	HUAN	20	1705.2	1713.1	24.8	11.1	4.4		
	9400	HUAN	22	1730	1814.5	73	14.7	5.6		
	15400	SGMR	3	1741.5	1742.3	9.7	125.0	22.0		
	10700	PENN	3	1741.7	1742.5	19.1	135.0	10.6		
	8800	SGMR	3	1741.5	1742.4	10.5	122.8	20.8		
	4995	SGMR	3	1741.8	1742.6	8.3	31.2	6.6		
	2800	OTTA	2	1742	1742.5	3	2.2	1.1		
	2700	PENN	5	1742.2	1742.4	1				
	2695	SGMR	4	1742	1742.3	2.2	11.9	5.9		
	2800	OTTA	20	1925	1955	120	5.2	2.6		
	9400	HUAN	20	1940.5	1949.9	57.8	16.9	8.0		
	9400	HUAN	20	2136.7	2150.3	24.8	13.5	7.4		
	2695	PENT	20	2154	2155	12	3.0	1.5		

Explanation of Type Code:

1 Simple 1	6 Minor	22 Simple 3F	27 Rise and Fall	32 Absorption	44 Noise Storm in Progress
2 Simple 1F	7 Minor +	23 Simple 3AF	28 Precursor	40 Fluctuation	45 Complex
3 Simple 2	8 Spike	24 Rise	29 Post Burst Increase	41 Group of Bursts	46 Complex F
4 Simple 2F	20 Simple 3	25 Rise A	30 Post Burst Increase A	42 Series of Bursts	47 Great Burst
5 Simple	21 Simple 3A	26 Fall	31 Post Burst Decrease	43 Onset of Noise Storm	48 Major
					49 Major +

Observatories:

ABST = Abastumani	HUAN = Huancayo	NERA = Nederhorst	SAOP = Sao Paulo
	IRKU = Irkutsk	NEUS = Neustrelitz	SLOU = Slough
BERL = Berlin-Adlershof	IZMI = Moscow IZMIRAN	ONDR = Ondrejov	SGMR = Sagamore Hill
BORD = Bordeaux	KIEL = Kiel	OTTA = Ottawa ARO	TOKO = Tokyo
BOUL = Boulder	KIEV = Kiev	PENN = Penn. State Univ.	TRST = Trieste
CRIM = Simferopol		PENT = Penticton	TYKW = Toyokawa
GORK = Gorky		POTS = Potsdam	UCCL = Uccle
	MANI = Manila	SANM = San Miguel	VORO = Voroshilov
HIRA = Hiraiso	MCMA = McMath-Hulbert		

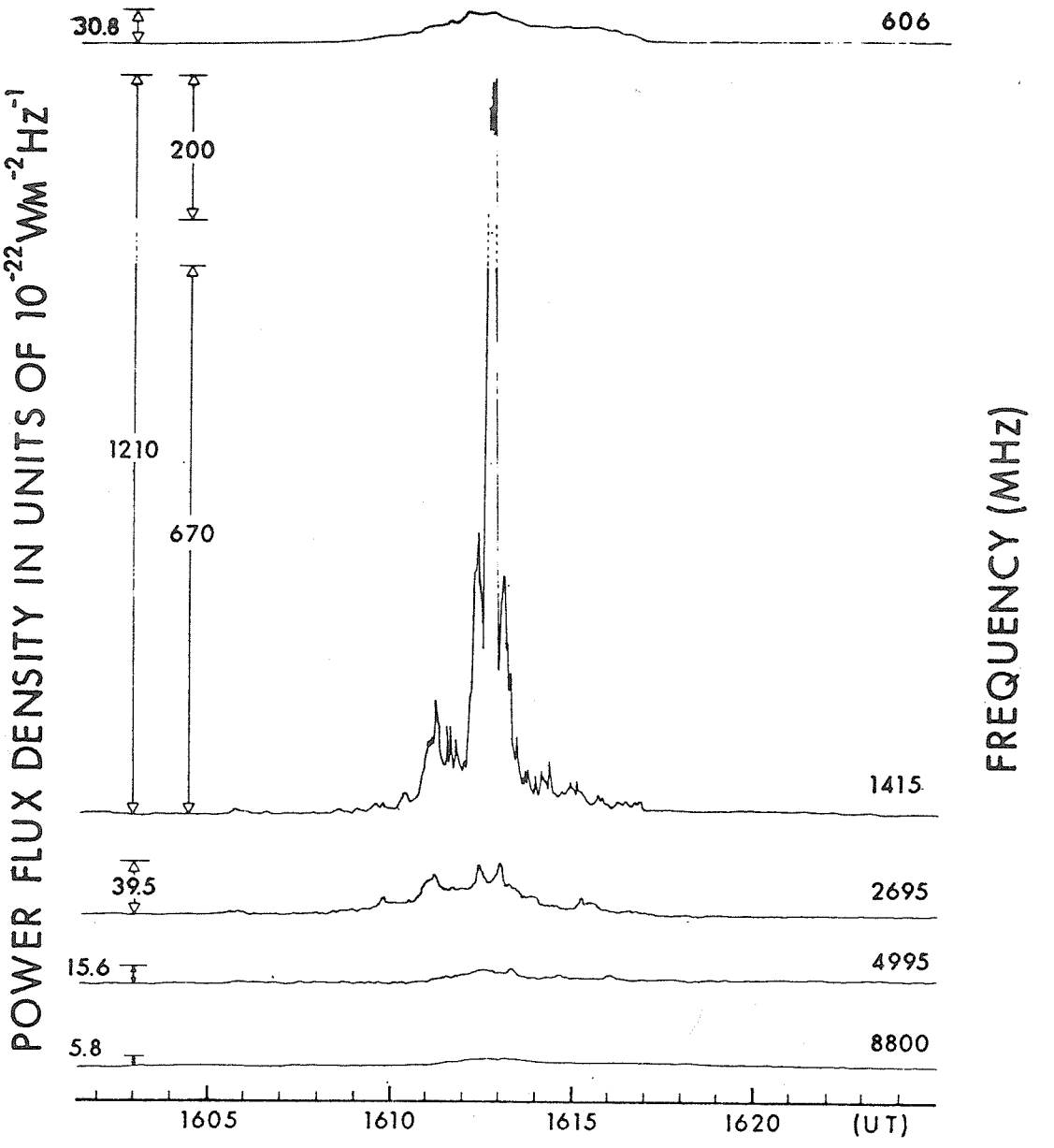


Figure 2. Complex Burst Observed on 21 February 1970 at Sagamore Hill Radio Observatory, Hamilton, Mass.

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1970

FEB. 1970	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT.	START UT	END UT	INT.	START UT	END UT	INT.	
18			CULG				1955	1955.5	1				IIIG,U
			CLRO				1955	1955.2	2				III
			CULG				2000	2350	1				I
			CULG				2046.5	2056	2				IIIGG,V,U
			CLRO				2046.5	2056	2	2046.5	2056	2	IIIG
			BOUL				2047.5	2055.2	3	2047.5	2055.2	3	IIIG
			HARV				2048	2056	2	2048	2053	2	IIIG
			BOUL				2142.3	2143	3	2142.3	2143	3	III
			HARV				2143	2144	3	2143	2144	3	IIIG
			CLRO				2143.4	2143.6	3	2143.4	2143.6	3	III
			CULG				2143.5	2144	1				IIIG,V,U
			CLRO				2209	2210	1	2209	2210	1	IIIG
			BOUL				2209	2211.3	3	2209	2211.3	3	IIIG
			CULG	2330.5		1	2330.5		1				IIIB
19	0000	0014	HARV						3				IIIB
	0000	0813	CULG				0000	0806	1				IIIN
	0000	0105	BOUL				.2	.7	3	.2	.7	3	III
			CULG				.5		3				IIIB
			CULG				0015	0813	1				I
			CULG				0113	0114.5	3				IIIG,V
			CULG				0157.5	0159	2				IIIG,U
	0705	1312	WEIS				0801.3	0801.6	1				IIIG
			WEIS				0805.4	0807.5	3				IIIG,DP
			CULG				0806		2				IIIB
			WEIS				0809	0809.2	2				IIIG,DP
			WEIS				0810.1	0811.3	3				IIIG,DP
			WEIS				0901.4	0901.7	3				IIIG,DP
			WEIS	0913	0914	1							IIIG,DP,RS
			WEIS				0940.6	0940.8	2				UNCLF
			WEIS				0951.6	0952.9	2				IIIG
			WEIS				0959.5	1000.5	2				IIIG,DP
			WEIS				1009.7	1010.3	3				IIIG,DP
			WEIS				1010.5	1015.5	1				IIIG
			WEIS				1019	1021.3	2				IIIG
	1510	1612	WEIS				1020	1532	1				I
	1100	2315	SGMR							1327	1327.6		IIIB
			SGMR							1349.6	1350.2		IIIB
	1400	1602	HARV				1400	1602	1				I,DC
	1613	2400	HARV	1401	1402	3	1401	1402	3				IIIG
	1416	1716	BOUL				1416 E	1853	2	1416 E	1853	2	CONT
	1610	1900	CLRO										
	1613	2400	HARV				1613	1920	2				I,DC
	1753	0100	BOUL				1614.3	1615	3	1614.3	1615	3	IIIG
			HARV	1623	1917	1							IN
			BOUL				1711.4	1713.1	3	1711.4	1713.1	3	IIIG
			HARV	1712		1	1711	1713	2				IIIGG,U
			HARV				1723	1934	2				IIIN
			BOUL				1853	1950	3	1853	1950	3	CONT
			HARV				1920	2357	1				IN
			BOUL				1950	2415 D	2	1950	2415 D	2	CONT
			HARV				2027	2029	2				IIIG,U
			BOUL				2027.4	2029	3	2027.4	2029	3	IIIG
	2056	2400	CULG				2056	2400	1				IIIN
			CULG				2056	2400	1				I
			HARV	2255	2256	1	2255	2256	2				IIIG
			CULG	2320	2321.5	1	2320	2321.5	1				IIIG,U
20	0000	0015	HARV										
	0000	0816	CULG				0000	0735	1				I
			CULG				0000	0812	1				IIIN
			CULG				0519.5	0530	1				IIIG
	1345	2400	HARV				1356	1640	1				I
			HARV	1407	1646	1							IN
	1414	0104	BOUL				1414 E	2440	3	1414 E	2440	3	CONT
	0652	1617	WEIS				1425.8	1426.2	1				IIIG
			HARV				1640	1810	2				I,DC
			HARV				1708	2048	1				IIIS
	1625	0030	CLRO				1723.2	1723.3	1	1723.2	1723.3	1	III
			CLRO				1727.7	1728.8	1	1727.7	1728.8	1	III
			CLRO				1728.9	1729	1	1728.9	1729	1	III
			CLRO				1745.2	1745.3	1				III
			CLRO				1747.3	1747.4	1	1747.3	1747.4	1	III
			CLRO				1747.7	1747.8	1	1747.7	1747.8	1	III
	1100	2315	SGMR							1800	2130		IV
			HARV				1810	2400	1				I
			CLRO				1820.4	1820.6	1	1820.4	1820.6	1	III
			CLRO				1826	1835	1	1826	1835	1	IIIG
			CLRO				1842	2230	1	1842	2230	1	CONT
	1948	2400	CULG				2003	2400	1				IIIN
			CULG				2012	2400	1				IS
			HARV	2046	2229	1							IN
			HARV				2051	2204	1				IIIN
			CULG				2100	2400	2				IS
			HARV				2207	2209	1				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1970

FEB 1970	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT.	START UT	END UT	INT.	START UT	END UT	INT.	
21	0000	0015	HARV				0000	0015	1				I
	0000	0815	CULG				0000	0223	2				IIIS
			CULG				0000	0225	2				IS
			CULG				0000	0327.5	1				IIIS
			CULG				0000	0727	1				IS
			CULG				0456	0745	1				IIIN
	0703	1618	WEIS				0816	0816.3	2				IIIB
			WEIS				0941.5	0941.8	1				IIIG
			WEIS				1155	1610	3				IDC
	1100	2315	SGMR							1230	1500		IV
	1345	2400	HARV				1350	1500	2				IC,DC
	1404	0058	BOUL				1404 E	1531	3	1404 E	1531	3	IV
			HARV	1447	1500	1							I
			HARV	1500	1540	3	1500	1540	3				IC
			BOUL				1531	1712	2	1531	1712	2	CONT
			HARV	1540	1729	1							IN
			HARV				1540	2000	2				IC
			BOUL				1605.2	1616.4	3	1605.2	1616.4	3	IIIGG
	1612	0015	CLRO				1712	2100	1				CONT
			BOUL				1712	2045	3	1712	2045	3	CONT
			HARV	1839	1840	1	1839	1840	1				IIIGG
			SGMR							1902.5	1903.2		IIIB
			SGMR							1903.2	2100		IV
			HARV	1949	1950	1	1949	1950	1	1949	1950	1	IIIG
			CLRO				1949.4	1921	2	1949.4	1921	2	IIIG
	1944	2400	CULG				1959.5	2354.5	1				I
			HARV				2000	2353	1				IN
			CULG				2015	2400	1				IIIN
			BOUL							2045	2140	1	CONT
			HARV	2137	2139	1	2137	2139	3	2137	2139	3	IIIGG,U
			BOUL							2137.3	2139.3	1	IIIG
			CULG				2137.5	2139	2				IIIGG,V,U
			CULG				2313.5	2315	1				IIIG
			HARV	2314	2315	1	2314	2315	2				IIIGG
			CULG	2351.5	2352.5	1	2351.5	2352.5	1				IIIG
22	0000	0016	HARV										
	0000	0815	CULG				0001.5	0440	1				IIIN
			CULG				0005	0210	1				I
			CULG				0318.5	0322.5	1				IIIGG
			CULG				0420	0452	1				I
			CULG				0430	0430.5	1				IIIG
			CULG				0729.5	0733	1				I
	0702	1015	WEIS				0800	0802	1				IIIG
			WEIS				0826.8	0827.2	1				IIIG
			WEIS				0914	0920	1				IIIGG,DP
	1345	2400	HARV				1354	1503	1				IN
	1414	2400	BOUL				1414	1636	1	1414	1636	1	CONT
			BOUL				1430.4	1432.8	2	1430.4	1432.8	2	IIIG
			HARV				1506	1556	1				I
			BOUL				1510.7	1511.5	3	1510.7	1511.5	3	IIIG
			HARV	1511		3	1511		2				IIIGG
			HARV				1558	2153	1				IN
	1100	2315	SGMR							1626.3	1627		IIIB
			BOUL				1636	1830	1	1636	1830	1	CONT
			BOUL							1841.5	1841.8	1	III
			HARV	1906	1907	1	1906	1907	1				IIIG
			BOUL							1947.8	1948.2	1	III
			HARV				2005		1				IIIG,U
	1949	2400	CULG	2016.5	2018.5	1							IIIG
			BOUL							2016.9	2018.6	1	IIIG
			HARV	2017	2018	2	2017	2018	2				IIIGG
			CULG				2035.5	2347.5	1				IIIN
			CULG				2111	2125	1				IW
			BOUL							2201.8	2206.3	3	IIIG
	1615	0000	CLRO				2201.9	2202.1	2	2201.9	2202.1	2	III
			HARV				2202	2203	1				IIIG
			CULG				2202	2207.5	1				IIIG,U
			CULG				2205		2				IIIB,U
			HARV				2205	2207	2				IIIG
			CLRO				2205.3	2205.4	2				III
23	0000	0017	HARV				0013	0015	2				IIIGG,RD
	0000	0812	CULG				0013	0722	1				IIIN
	0000	0057	BOUL				0013.5	0014.9	2	0013.5	0014.9	2	IIIG
	1100	2315	SGMR										
	1418	0053	BOUL				1437.5	1440.6	1	1437.5	1440.6	1	IIIG
			BOUL				1450.8	1451.5	1	1450.8	1451.5	1	III
	1345	2400	HARV	1455	1457	2							IIIG
			HARV	1522	1523	2	1522	1523	2				IIIG
	1310	1620	WEIS				1522.3	1522.8	2				IIIG
			BOUL				1626.2	1626.7	2	1626.2	1626.7	2	III
	1711	0028	CLRO										
			HARV				1757	2103	1				IN
			HARV				2103	2400	1				I
			BOUL				2108	2312	1	2108	2312	1	CONT
	1947	2347	CULG				2115	2347	1				IIIN
			CULG				2115.5	2347	1				I
			HARV	2345	2355	1							IN

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1970

FEB. 1970	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT.	START UT	END UT	INT.	START UT	END UT	INT.	
23	2349	2400	CULG CULG				2349 2349	2353.5 2400	1 1				IIIN I

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
CONT = Continuum
UNCLF = Unclassified activity

Note:

No observations were made at Culgoora in February 1970 at 04/0810 - 05/1951. The dm band was not recording 20/0657 - 20/2006. The band 8-24.7 MHz was not recording 23/2220 - 24/2325 and 25/2220 - 26/0225. The band 24.7-74 MHz was not recording 24/2325 - 25/2220.

SOLAR X-RAY FLARES (2-12 A°)
SATELLITES EXPLORER 33 AND EXPLORER 35

FEBRUARY 1970

University of Iowa

Date 1970	Onset U.T.	Maximum U.T.	Peak-Ratio to Quiet Sun	Remarks and Values of Maximum Flux F(2-12 A°)
19 February	0324	0339	5	
	0931	0938	7	0.024 erg $(cm^2\ sec)^{-1}$
20 February	0941	1001	20	0.059 erg $(cm^2\ sec)^{-1}$
23 February	1741	1746	4	
24 February	0854	0857	7	
25 February	0735	0738	4-	
27 February	1906	1913	7	
	2318	2323	23	0.058 erg $(cm^2\ sec)^{-1}$
28 February	1255	1306	13	0.031 erg $(cm^2\ sec)^{-1}$
	1908	1916	11	0.044 erg $(cm^2\ sec)^{-1}$

SOLAR X-RAYS BY SATELLITE

EXPLORER 37

February 19-23, 1970

NAVAL RESEARCH LABORATORY

OUTSTANDING EVENTS

DAY	START TIME	0.5-3A FLUX XE-5	PEAK TIME	1-8A FLUX XE-4	PEAK TIME	8-20A FLUX XE-3	PEAK TIME	END TIME	COMMENTS
19	0325E	130,00D	0339E	390,00	0339	120,00	0352	0432D	
19	0842	32,00	0844	130,00	0845	67,00	0846	0927	
19	1010E	5,60D	1010E	66,00D	1010E	53,00	1011	1018	
19	1511	8,90	1529	52,00	1530	40,00	1547E	1547	
19	1835	4,50	1839	37,00	1839	40,00	1843	1844	
19	1851	4,50	1852	53,00	1903	53,00	1909E	1909	
19	1958	41,00	2000	130,00	2004	67,00	2005	2026	
19	2214	13,00	2224	83,00	2231	53,00	2234	2235D	
19	2306E	23,00	2325	87,00	2326	53,00	2329	2355	
20	0732	7,80	0734	44,00	0734	40,00	0740E	0740	
20	0742	4,50	0745	37,00	0746	40,00	0748E	0748	
20	0944	130,00D	0946E	1400,00	0959	330,00	1001	1320D	
20	1719	45,00	1730	130,00	1729	67,00	1730	1810	
20	2343E	6,70D	2343E	44,00	2346	40,00	2358E	2358D	
21	0848E	6,70D	0848E	33,00	0849	29,00	0855E	0855	
21	0942	12,00	1000	58,00	0945	40,00	1002	1004	TWO FLARES
21	1447	34,00	1829	60,00	1829	53,00	1824	1943	HIGH BACKGROUND
21	2121	7,80	2126	52,00	2126	40,00	2149E	2149	
22	1150	3,30	1152	38,00	1153	40,00	1156	1158	
23	1455	46,00	1456	130,00	1456	40,00	1507	1508D	
23	1751E	17,00D	1751E	87,00D	1751E	53,00	1752	1804	

SOLAR X-RAYS MEASURED BY SATELLITE
SOLRAD 9-EXPLORER 37

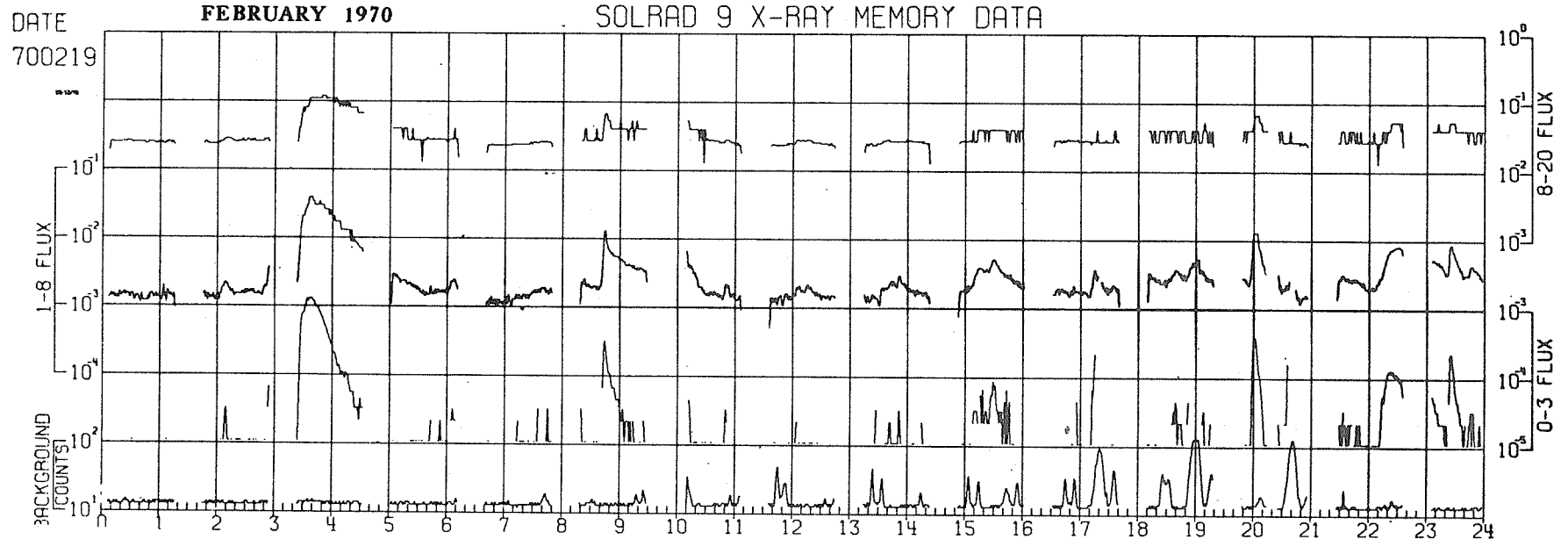
FEBRUARY 19-23, 1970

NAVAL RESEARCH LABORATORY 1-8A HOURLY AVERAGES (10^{-3} ergs/cm^2/sec.)

DAY	HOUR																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
19	1,38	1,39	1,70	26,2	12,3	1,94	1,52	1,51	4,19	3,92	2,14	1.31	1,66	1,89	1,66	3,14	1,79	1,89	3,01	3.31	3,55	2,55	4,99	4,37
20	2,48	1,70	1,66	1,46	1,40	1,15	1,29	2,51	1,58	29,4	42,4	16,3	5,86	3,13	2,28	2,06	1,85	6,10	2,29	1,17	1,06	1,46	1,00	2,48
21	1,74	0,95	1,30	1,04	1,20	1,00	1,03	1,01	1,56	4,03	2,06	1,63	1,88	1,66	2,83	4,31	3,90	3,47	4,07	3,47	2,37	3,25	1,67	1,26
22	1,39	1,09	1,24	2,11	1,65	1,25	1,28	1,68	0,97	1,14	1,39	2,20	1,51	0,95	1,22	1,21	1,19	0,93	1,40	0,99	1,30	0,94	0,98	0,93
23	1,19	1,14	1,28	1,25	1,44	1,57	1,97	0,96	1,09	1,11	1,35	1,28	1,03	1,01	2,00	3,26	1,49	3,64	1,52	1,13	1,46	1,37	1,63	1,04

NAVAL RESEARCH LABORATORY 8-20A HOURLY AVERAGES (10^{-2} ergs/cm^2/sec.)

DAY	HOUR																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
19	2,49	2,35	2,62	9,63	8,48	2,99	2,46	2,45	3,63	3,91	3,13	2,31	2,61	2,61	2,55	3,57	2,78	2,76	3,40	3,56	3,62	3,06	3,78	4,05
20	3,05	2,70	2,71	2,49	2,34	2,17	2,21	3,05	2,50	7,64	15,2	10,6	6,20	3,91	3,15	2,75	2,61	4,27	2,95	2,23	1,97	2,17	2,00	2,64
21	2,55	1,85	2,05	1,86	1,99	1,90	1,89	1,78	2,13	3,29	2,33	2,20	2,37	2,28	2,66	3,42	3,50	3,07	3,45	3,70	2,73	3,30	2,42	2,08
22	2,01	1,88	2,06	2,54	2,43	2,11	2,02	2,04	1,84	1,87	2,05	2,47	2,29	1,74	1,82	1,86	1,90	1,85	2,05	2,10	2,10	1,78	1,83	1,75
23	1,80	1,84	1,80	1,97	2,14	2,00	2,33	1,78	1,82	1,79	2,00	1,99	1,80	1,76	2,07	2,59	2,10	3,08	2,21	1,84	2,03	2,02	2,10	1,80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FEBRUARY 1970
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8-20 FLUX
0-3 FLUX
BACKGROUND (COUNTS)
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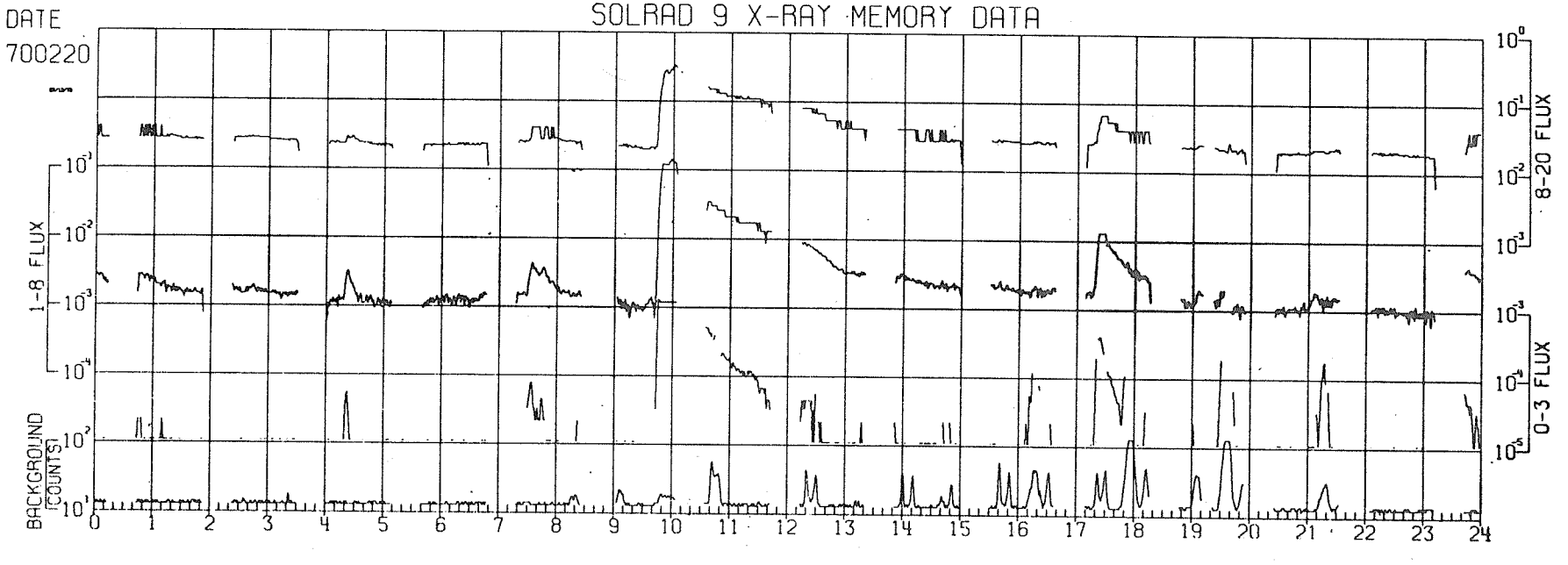
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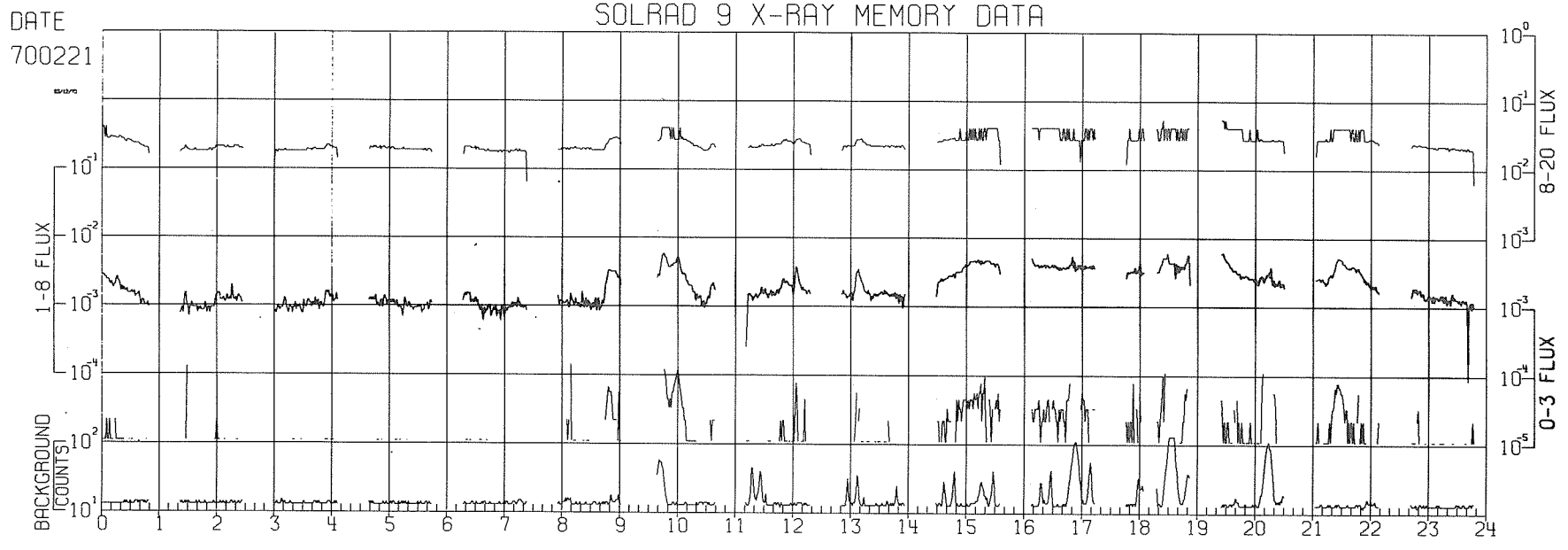
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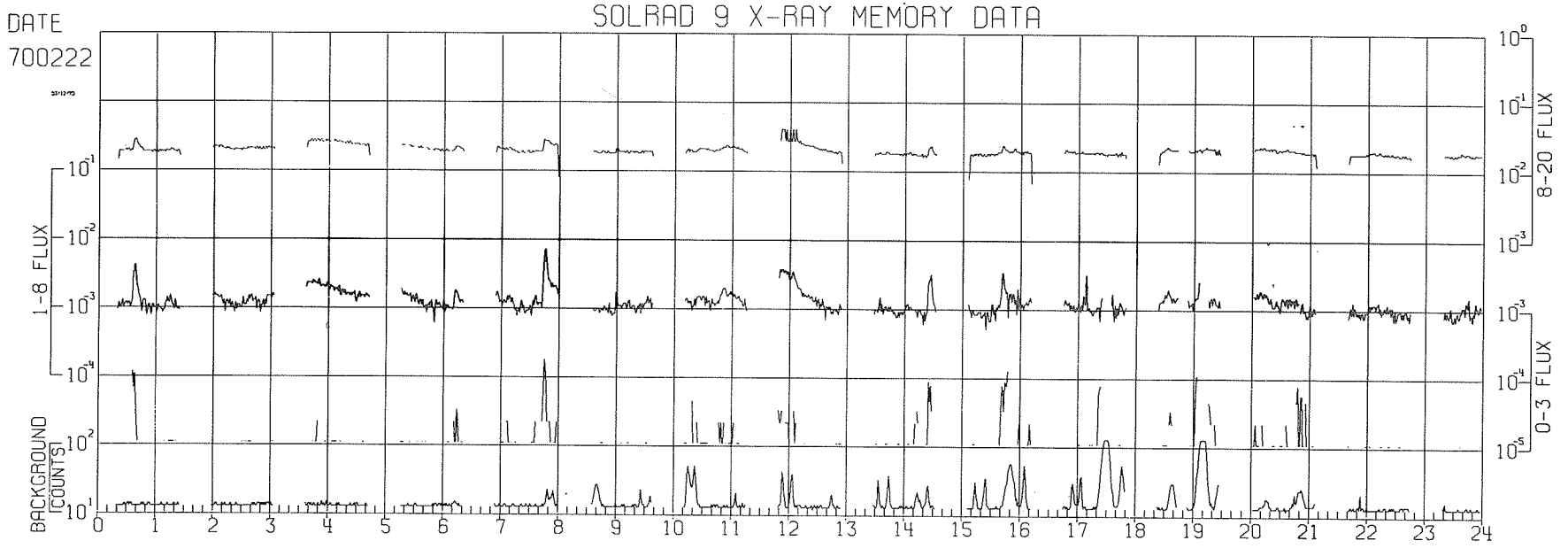
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8-20 FLUX
0-3 FLUX
BACKGROUND (COUNTS)
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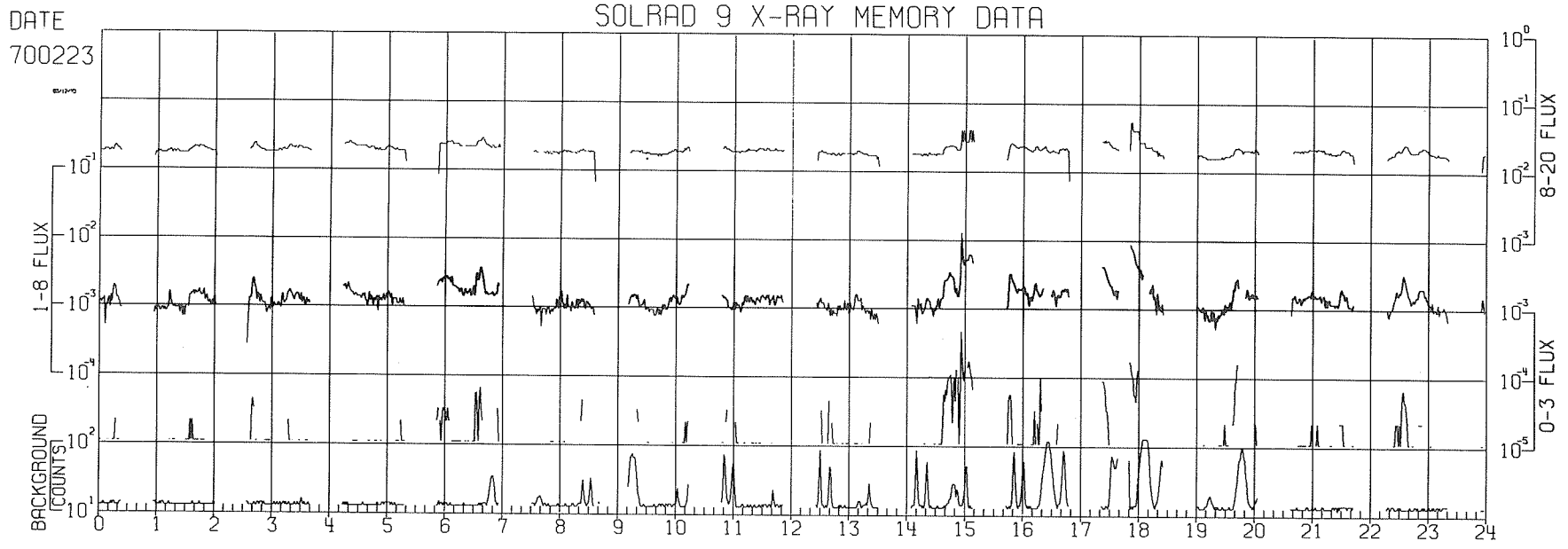
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8-20 FLUX
0-3 FLUX
BACKGROUND (COUNTS)
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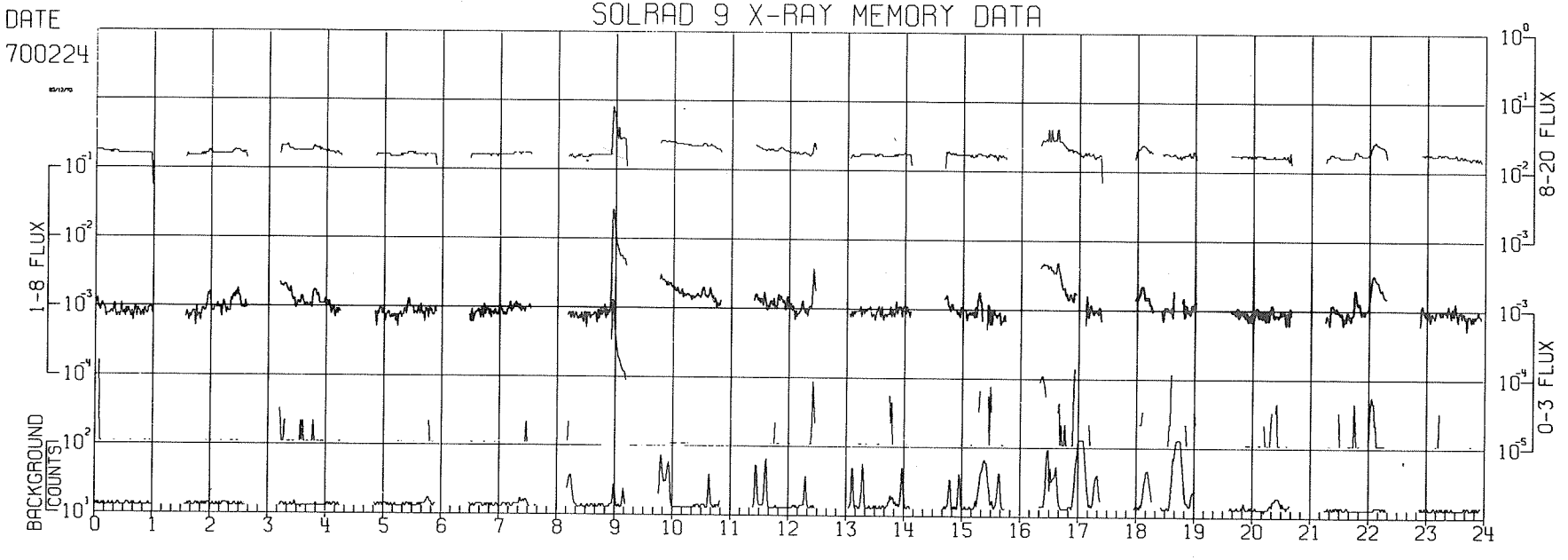
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8-20 FLUX
0-3 FLUX
BACKGROUND (COUNTS)
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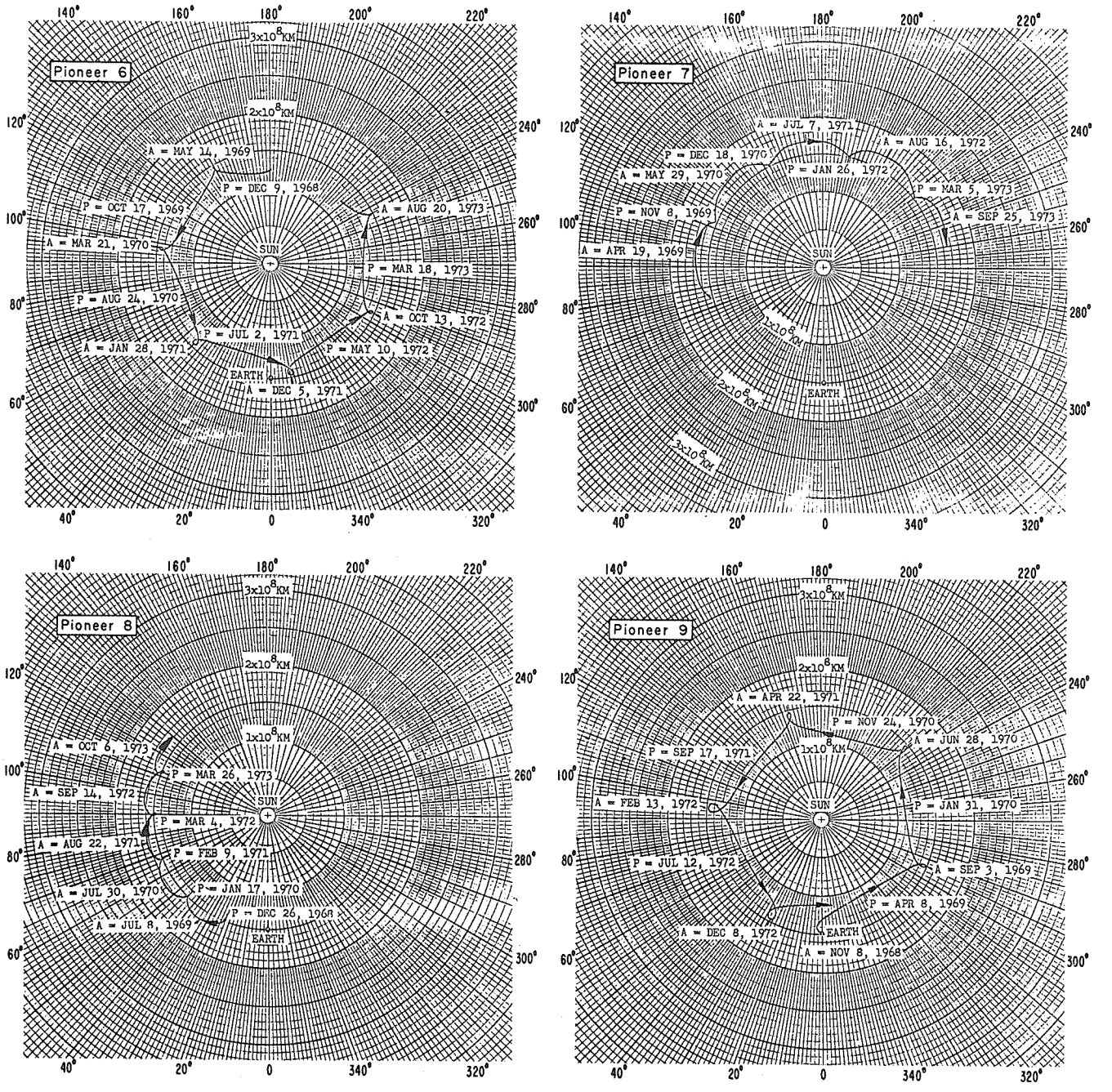
LOCATION OF PIONEER SPACECRAFTS

A = APHELION
P = PERIHELION



The above diagrams illustrate the position of Pioneers 6, 7, 8 and 9. Several types of observations are reported from these spacecraft.

COSMIC RAY PROTONS

FEBRUARY 1970

Counting Rates (particles/sec)

Univ. of Chicago

Pioneer VI					Pioneer VII			
Date Feb.	Time (UT)	0.6-13 Mev*	13-175 Mev**	>175 Mev	Time (UT)	0.6-13 Mev*	13-175 Mev**	>175 Mev
19	2330	1.12	.0618	.250	2100	6.50R	.0541	.132
21	2345	44.1F	.0574	.261	1915	12.7R	.0560	.112
22	2345	25.2F	.0628	.265	1930	26.2	.0610	.114
24	2345	7.80F	.0572	.261	2030	14.6F	.0615	.122
26	2410	3.02F	.0603	.244	2040	4.88	.0549	.108

* Includes He 0.6-13 Mev/nucleons and electrons ∿0.5 Mev -see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleon.

Notes: (1) Data are subject to future determination of possible saturation during enhanced flux observations.
(2) Pioneer heliographic longitude is given in the solar wind tabulations in terms of "co-rotation" delay time (days).
(3) Unidirectional geometrical factors are 5.8×10^{-4}, 1.15×10^{-4}, $1.7 \times 10^{-4} m^2 ster$ for the three ascending energy intervals given above. The two higher energy intervals have a bidirectional response at energies greater than ∿100 Mev/nucleon. See Fan, Pick, Pyle, Simpson, and Smith, J. Geophys. Res., 73, 5, 1552-1582 for a description of the University of Chicago instruments.
(4) Quiescent counting rates are:
Pioneer 6 0.1, 0.056, 0.3 counts per second
Pioneer 7 0.1, 0.055, 0.14 counts per second for the three ascending energy intervals.
(5) Times are only approximate (time accurate to approximately ± 15 minutes).
(6) The letters F and R following a counting rate indicate that rate was generally falling or generally rising during the tracking period. No letter means a generally steady rate during the track.

FEBRUARY 1970

University of New Hampshire

Pioneer VIII				Pioneer IX		
Date Feb.	Time (UT)	>13.9 Mev	>64 Mev	Time (UT)	>13.9 Mev	>40 Mev
19	0324	3.99	.72	1817	5.24	.64
	0810	4.09	.80			
	1115	4.00	.73			
	1558	3.97	.71			
20	0336	3.90	.72			
	0716	4.01	.81			
	1225	4.23	.75			
	1600	4.01	.87			
21	0330	4.10	.62			
	0730	4.01	.68			
	1115	4.00	.69			
	1615	3.93	.70			
22	1147	4.04	.71	1645	3.05	.55
	1635	4.00	.75			
23	0330	4.02	.79			
	0730	3.99	>.52			
	1103	4.03	>.42			
	1622	4.25	.79			
24	0330	3.94	.70	1550	3.03	.57
	0630	4.01	>.65			
	1207	3.89	.69			
	1627	3.80	.74			
25	0400	3.93	.67			
	0700	3.90	.72			
	1209	3.86	.76			
	1609	3.98	.75			
26	0327	3.88	.69	1603	3.10	.62
	0654	4.02	.72			
	1111	3.89	.77			
	1651	3.80	.75			
27	0416	3.82	.70			
	0655	3.90	.67			
	1118	3.86	.62			
	1657	3.80	.71			
28	0412	3.83	.71	1600	3.08	.69
	0803	4.05	.68			
	1208	3.86	.80			
	1601	3.93	.75			

SOLAR PROTON MONITORING ATS-1 (1966-110A)

FEBRUARY 19-23, 1970

Aerospace Corp.

Energy level 5-21 Mev - Hourly Averages (particles $cm^{-2}sec^{-1}$)

Day	Hour 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
19	0.27	0.15	0.05	--	--	0.26	0.15	0.15	0.26	0.26	0.10	0.15	0.21	0.10	0.10	0.10	0.26	0.21	--	0.15	--	0.05	0.15	0.10
20	0.10	0.05	0.10	--	--	0.31	--	0.05	0.15	0.36	0.21	0.10	0.21	0.10	0.10	--	0.21	--	--	--	--	--		--
21	0.15	--	0.15	--	--	--	--	0.10	0.15	0.31	0.15	--	--	--	--	--	--	--	--	--	--	--	--	0.05
22	--	--	--	--	--	0.05	--	0.05	0.10	0.10	0.15	0.10	0.31	0.15	--	--	--	--	--	--	0.10	--	0.10	--
23	--	--	--	--	--	0.26	0.10	--	0.10	0.10	0.15	--	0.21	0.31	--	--	--	--	--	--	--	--	0.15	--

Energy level 21-70 Mev - Hourly Averages (particles $cm^{-} sec^{-1}$)

Day	Hour 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
19	0.37	0.33	0.44	--	--	0.38	0.34	0.35	0.46	0.35	0.39	0.36	0.35	0.41	0.32	0.42	0.34	0.37	0.38	0.41	0.35	0.36	0.43	0.27
20	0.35	0.35	0.32	--	--	0.30	0.40	0.40	0.36	0.41	0.31	0.38	0.33	0.26	0.42	0.38	0.35	--	--	--	--	--	--	--
21	0.36	0.28	--	--	0.36	--	0.32	0.36	0.30	0.28	0.31	0.38	0.38	--	--	--	--	--	--	--	--	--	--	0.34
22	--	--	--	--	--	0.38	0.32	0.37	0.37	0.30	0.35	0.37	0.42	0.32	--	--	--	--	--	--	0.27	--	0.40	--
23	--	--	--	--	--	0.38	0.30	0.32	0.33	0.39	0.37	0.43	0.28	0.38	--	--	--	--	0.28	0.32	--	--	0.32	0.34

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

FEBRUARY 1970

PROTON ENERGY GREATER THAN 60 MEV. HOURLY AVERAGES. IMPG SOLAR PROTON MONITOR. JHU/APL AND GSFC

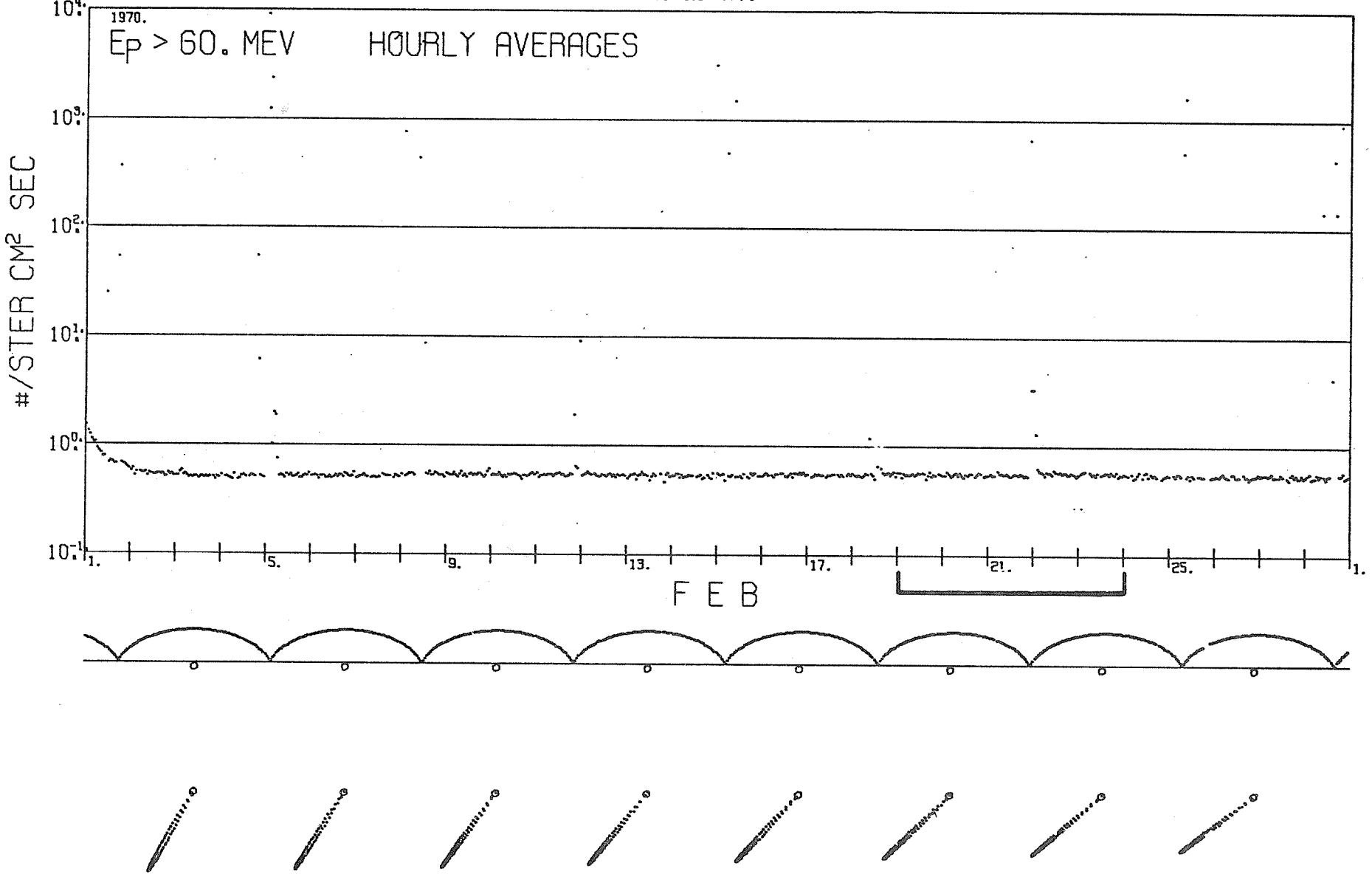
YEAR 1970

DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2 1	32	1.54	1.35	1.25	1.14	1.08	1.06	0.94	0.88	0.84	0.79	0.79	25.1	0.69	0.72	0.71	0.67	0.68	53.6	369.	0.69	0.67	0.67	0.63	0.62
2 2	33	0.58	0.61	0.52	0.57		0.57	0.56	0.55	0.57	0.52	0.56	0.54	0.53	0.53	0.55	0.54	0.53	0.55	0.52	0.52	0.56	0.54	0.54	0.52
2 3	34	0.53	0.53	0.57	0.59	0.54	0.54	0.53	0.50	0.51	0.50	0.52	0.52	0.50	0.52	0.51	0.50	0.51	0.51	0.52		0.51	0.49	0.51	0.51
2 4	35	0.54		0.51	0.51	0.51	0.50	0.48	0.54		0.49	0.49	0.52	0.53	0.52		0.52	0.54	0.53	0.51	54.7	6.08	0.52	0.51	0.51
2 5	36	20122	1246	2373	1.03	2.00	1.92	0.75	0.52	0.53	0.52	0.50	0.54	0.53	0.55	0.52	0.51	0.53	0.55	0.51	0.51	0.52	0.54	0.53	0.56
2 6	37	0.53	0.53	0.53	0.53	0.49	0.53	0.52	0.53	0.51	0.51	0.53	0.51	0.51	0.54	0.52	0.54	0.54	0.52	0.56	0.54	0.53	0.52	0.53	0.56
2 7	38	0.50	0.52	0.52	0.52	0.55	0.53	0.51		0.50	0.51	0.52	0.51	0.52		0.55	0.54	0.52	0.53	0.53		0.51	0.54	0.53	0.52
2 8	39	0.55	767.	0.53	0.54	0.56	0.55	0.56	0.54	4909	446.	5116		8.70	0.56	0.55	0.57	0.53	0.54	0.56	0.56	0.54	0.54	0.54	0.52
2 9	40	0.56	0.54	0.53	0.53	0.57	0.54	0.52	0.55	0.57	0.53	0.54	0.52	0.55	0.56	0.54	0.54	0.53	0.56	0.55	0.53	0.52	0.53	0.58	0.61
2 10	41	0.54	0.55	0.53	0.53	0.57	0.54	0.51	0.53	0.52	0.55	0.54	0.54	0.56	0.55	0.53	0.52	0.50	0.53	0.53	0.53	0.53	0.56	0.56	0.54
2 11	42	0.56	0.52	0.54	0.54	0.55	0.53	0.55	0.55	0.54	0.53	0.54	0.56	0.56	0.54	0.55	0.53	0.53	0.54	0.55	0.55	1.94	0.65	0.63	9.21
2 12	43	0.54	0.55	0.56	0.58	0.55	0.54		0.55	0.54	0.52	0.52	0.55	0.53	0.53	0.55	0.56	0.52	0.54	0.52	0.54	0.53	0.54	0.54	0.54
2 13	44	0.51	0.53	0.55	0.65	0.56	0.50	0.54	0.55	0.58	0.54	0.55	0.53	0.49	0.52	0.55	0.54			0.56		0.46	0.55	0.57	0.53
2 14	45	0.53	0.53	0.56	0.56	0.52	0.54	0.52	0.53	0.53	0.55	0.53	0.53		0.53	0.53	0.54	0.50	0.52		0.55	0.52	0.51	0.57	
2 15	46	0.57	0.55	0.55	0.55	0.49	497.	0.53	0.53	0.55	1497	0.53	0.53	0.54	0.51	0.56		0.52	0.51	0.57	0.54	0.56		0.54	0.53
2 16	47	0.54	0.56	0.57	0.54		0.55	0.53	0.56	0.55		0.56	0.57	0.53	0.53	0.55	0.56	0.53	0.56	0.57	0.56	0.58	0.56	0.58	0.55
2 17	48	0.56		0.52	0.54	0.56	0.54	0.56	0.54	0.55		0.53	0.54	0.54	0.55	0.55		0.55	0.54	0.56	0.54		0.54	0.57	0.54
2 18	49	0.56	0.54	0.53	0.54	0.54	0.53	0.55	0.57	0.56	1.21	0.56	0.55	0.50	0.67		0.64	0.58	0.56	0.56	0.58	0.54	0.57	0.59	0.53
2 19	50	0.58	0.58	0.53	0.57	0.55	0.56	0.55	0.56	0.56	0.54	0.56	0.58	0.57	0.57	0.57	0.51	0.55	0.59	0.54	0.55	0.55		0.57	0.56
2 20	51	0.54	0.54	0.59	0.56	0.54	0.54	0.56	0.57	0.54	0.58	0.55	0.53	0.56	0.55	0.56	0.57		0.53	0.56	0.57	0.57		0.53	0.54
2 21	52	0.55	0.57	0.54	0.54		0.60	0.57	0.57	0.55	0.55	0.57	0.55	0.54	0.55	0.56	0.56	0.55	0.57	0.56	0.54	0.55	0.54	657.	3.40
2 22	53	3.35	1.32	0.63	0.61	0.58	0.58	0.54	0.59	0.58	0.58	0.56	0.61	0.59	0.58	0.59	0.57	0.58	0.58	0.56	0.55	0.57	0.57	0.56	0.54
2 23	54	0.56	0.58	0.59	0.60			0.59	0.56	0.56	0.54	0.58		0.56	0.56	0.58	0.58	0.56	0.59	0.57	0.56	0.59	0.54	0.56	0.55
2 24	55	0.57	0.56	0.54		0.57	0.52	0.53	0.56	0.59		0.53	0.58	0.59	0.54	0.57	0.54	0.56	0.53			0.52	0.54	0.54	0.55
2 25	56	0.55		0.55	0.53	0.57	0.57	0.54	502.	1631	0.54	0.55	0.52	0.56	0.53		0.55	0.54	0.54	0.54				0.53	0.54
2 26	57	0.54	0.55	0.54	0.56	0.58	0.54	0.54	0.53		0.56	0.56	0.54	0.53	0.54		0.57	0.54	0.54	0.50	0.52	0.54	0.54	0.55	0.57
2 27	58	0.55	0.56	0.56	0.55	0.54	0.55	0.58	0.54	0.54		0.53	0.57	0.55		0.53	0.51	0.55	0.58	0.54	0.55	0.52	0.52	0.56	0.53
2 28	59	0.54	0.56	0.58	0.52	0.52	0.53	0.56	0.54	0.55	144.	0.55	0.52	0.54	0.56	4.29	431.	143.		0.55	0.56	0.59	0.52	0.54	0.55

SOLAR PROTONS BY SATELLITE

EXPLORER 41 (1969-53A)

FEBRUARY 1970



SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

FEBRUARY 1970

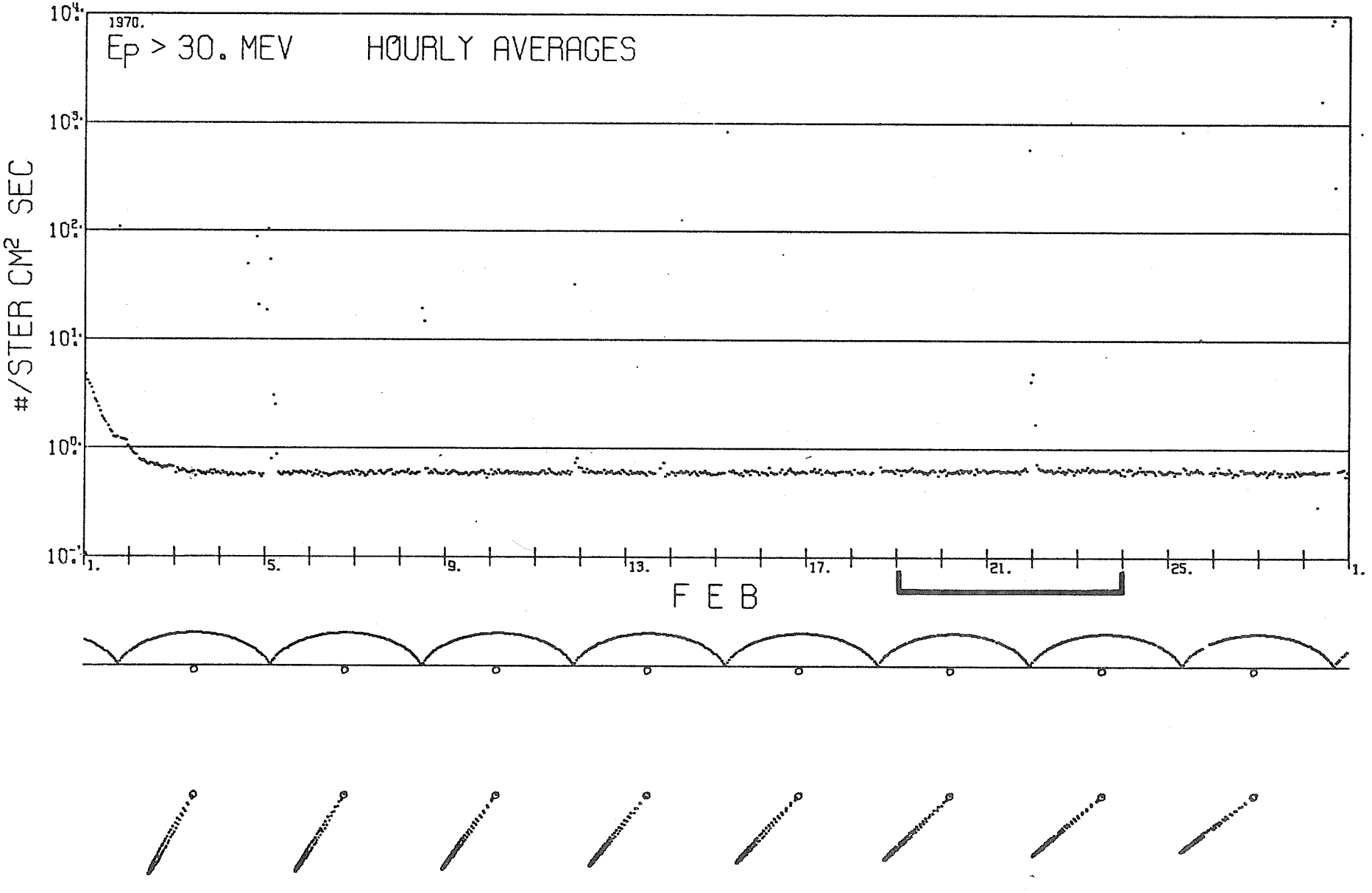
PROTON ENERGY GREATER THAN 30 MEV. HOURLY AVERAGES. IMPG SOLAR PROTON MONITOR. JHU/APL AND GSFC

YEAR 1970

DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2 1	32	4.77	4.17	3.90	3.61	3.21	2.80	2.65	2.39	2.17	1.93	1.83	1.73	1.59	1.44	1.39	1.27	1.24	1.27	109.	1.23	1.21	1.20	1.18	1.04
2 2	33	0.96	0.92	0.88	0.86		0.79	0.76	0.77	0.74	0.72	0.70	0.72	0.72	0.68	0.72	0.63	0.68	0.65	0.67	0.66	0.67	0.68	0.68	0.67
2 3	34	0.59	0.65	0.62	0.61	0.63	0.62	0.60	0.59	0.59	0.62	0.61	0.59	0.61	0.60	0.58	0.59	0.57	0.60	0.59	0.62	0.57	0.62	0.59	0.60
2 4	35	0.57	0.61	0.59	0.59	0.56	0.57	0.59	0.57		0.57	0.57	0.55	0.58	0.57	49.7	0.59	0.60	0.58	0.59	88.5	21.0	0.57	0.55	0.58
2 5	36	18.6	104.	54.2	0.80	3.08	2.54	0.89	0.60	0.57	0.57	0.60	0.60	0.60	0.57	0.58	0.62	0.60	0.60	0.59	0.61	0.60	0.59	0.58	0.61
2 6	37	0.60	0.56	0.58	0.62	0.56	0.60	0.54	0.59	0.58	0.58	0.56	0.57	0.58	0.59	0.58	0.60	0.60	0.60	0.58	0.59	0.60	0.57	0.62	0.58
2 7	38	0.63	0.62	0.57	0.61	0.59	0.56	0.57	0.60	0.62	0.61	0.58	0.58	0.61	0.62	0.59	0.58	0.60	0.62	0.62	0.64	0.58	0.57	0.60	0.59
2 8	39	0.61	0.61	0.60	0.60	0.63	0.58	0.61	0.60	0.57	0.61	0.60	19.5	14.7	0.65	0.65	0.58	0.62	0.59	0.63	0.61	0.59	0.59	0.58	0.59
2 9	40	0.63	0.58	0.59	0.61	0.62	0.62	0.60	0.58	0.59	0.58	0.59	0.60	0.57	0.59	0.61	0.60	0.58	0.60	0.60	0.63	0.62	0.59	0.54	0.58
2 10	41	0.63	0.58	0.61	0.60	0.64	0.60	0.59	0.59	0.61	0.62	0.60	0.60	0.62	0.59	0.61	0.58	0.60	0.58	0.60	0.60	0.60	0.58	0.60	0.59
2 11	42	0.59	0.58	0.61	0.62	0.62	0.59	0.59	0.64	0.61	0.60	0.59	0.58	0.60	0.58	0.61	0.61	0.59	0.62	0.58	0.61	32.3	0.74	0.82	0.68
2 12	43	0.67	0.61	0.60	0.65	0.61	0.63	0.61	0.60	0.59	0.61	0.60	0.60	0.64	0.59	0.62	0.60	0.62	0.59	0.59	0.60	0.61	0.59	0.64	0.62
2 13	44	0.59	0.57	0.62	0.59	0.61	0.59	0.61	0.59	0.61	0.60	0.58	0.57	0.62	0.60	0.59	0.59			0.66		0.74	0.55	0.59	0.58
2 14	45	0.62	0.60	0.57	0.60	0.60	0.62	0.60	0.60	0.62	0.61	0.58	0.61	0.62	0.59	0.57	0.62	0.60	0.60	0.62	0.59	0.60	0.58	0.58	0.58
2 15	46	0.58	0.60	0.58	0.60	0.60	829.		0.63	0.62	0.64	0.61	0.60	0.58	0.60	0.57	0.64	0.61	0.62	0.58	0.64	0.63	0.63	0.61	0.58
2 16	47	0.61	0.60	0.60	0.58	0.68	0.62	0.60	0.60	0.59		0.61	0.64	0.59	0.60	0.54	0.66	0.62	0.61	0.60	0.62	0.60	0.62	0.62	0.61
2 17	48	0.61		0.63	0.62	0.60	0.61	0.61	0.64	0.59		0.61	0.64	0.61	0.60	0.62	0.58	0.61	0.61	0.62	0.63		0.62	0.61	0.63
2 18	49	0.59	0.65		0.62	0.60	0.61	0.62	0.60			0.59	0.61			1004	0.59	0.63	0.64	0.63	0.63	0.62	0.63	0.63	0.60
2 19	50	0.64	0.64	0.58	0.63	0.65	0.63	0.64	0.65	0.67	0.62	0.64	0.61	0.64	0.62	0.50	0.61	0.59	0.61	0.64	0.65	0.63		0.57	0.64
2 20	51	0.62	0.64	0.58	0.61	0.61	0.60	0.61	0.62	0.63	0.61	0.65	0.62	0.64	0.63	0.61	0.64		0.59	0.66	0.62	0.62		0.65	0.63
2 21	52	0.62	0.62	0.62	0.63		0.64	0.64	0.61	0.63	0.63	0.61	0.64	0.62	0.63	0.62	0.63	0.62	0.61	0.64	0.66	0.67	0.64	583.	4.21
2 22	53	4.92	1.68	0.73	0.68	0.65	0.65	0.64	0.62	0.65	0.63	0.65	0.61	0.62	0.64	0.59	0.62	0.64	0.60	0.62	0.66	0.65	0.64	0.60	0.63
2 23	54	0.65	0.62	0.66	0.65	0.66	0.68	0.62	0.65	0.66	0.64	0.63	0.65	0.64	0.64	0.63	0.64	0.66	0.62	0.63	0.64	0.65	0.62	0.63	0.59
2 24	55	0.66	0.58	0.64	0.67	0.65	0.59	0.61	0.62	0.64	0.69	0.64	0.64	0.60	0.63	0.63	0.64	0.63	0.59		0.64	0.63	0.60	0.61	0.60
2 25	56	0.62	0.64	0.62	0.58	0.61	0.62	0.61	853.	0.69	0.66	0.61	0.60	0.64	0.62	0.54	0.66	0.62	0.63	0.61				0.61	0.62
2 26	57	0.59	0.63	0.69	0.63	0.62	0.61	0.60	0.62	0.66	0.62	0.57	0.61	0.60	0.59	0.65	0.65	0.61	0.62	0.63	0.62	0.62	0.63	0.62	0.59
2 27	58	0.60	0.63	0.61	0.63	0.57	0.61	0.63	0.61	0.64		0.62	0.58	0.62		0.57	0.62	0.58	0.62	0.61	0.58	0.64	0.61	0.59	0.62
2 28	59	0.63	0.61	0.62	0.62	0.62	0.64	0.60	0.61	0.61	1630	0.61	0.63	0.62	0.63	835729791	262.		0.63	0.64	0.64	0.66	0.56	0.63	

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

FEBRUARY 1970



SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

FEBRUARY 1970

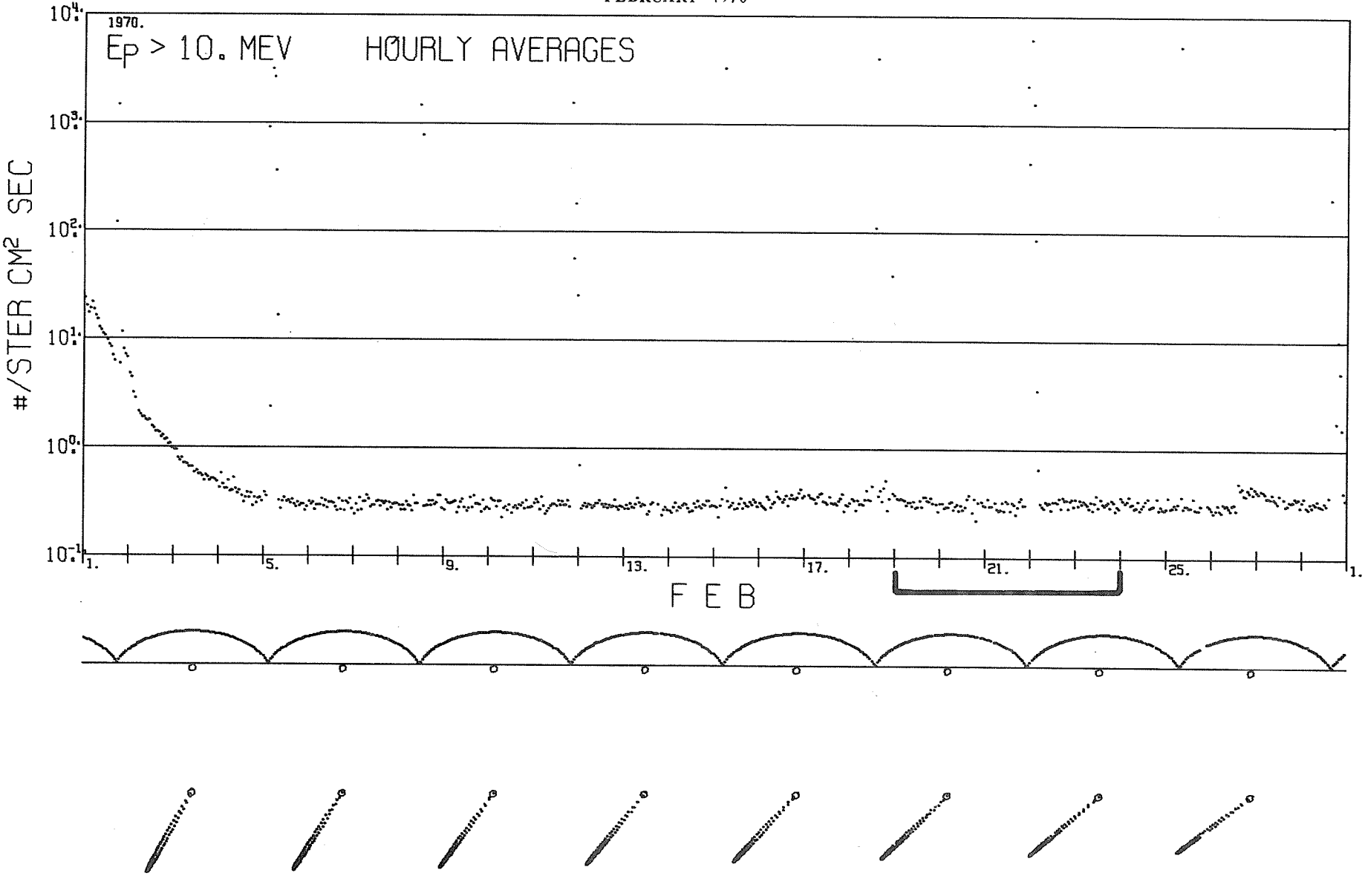
PROTON ENERGY GREATER THAN 10 MEV. HOURLY AVERAGES. IMP6 SOLAR PROTON MONITOR. JHU/APL AND GSFC

YEAR 1970

DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	1	32	24.2	20.3	17.3	18.9	21.6	18.6	16.4	15.1	12.8	12.0	11.0	10.8	9.67	8.83	8.36	6.97	6.27	120.	1488	5.87	11.6	7.97	7.16	6.70
2	2	33	4.76	4.41	3.18	2.85		2.14	2.01	1.91	1.91	1.79	1.76	1.80	1.57	1.51	1.39	1.39	1.37	1.26	1.30	1.18	1.21	1.07	1.08	0.99
2	3	34	0.96	0.95	0.81	0.75	0.80	0.72	0.72	0.70	0.66	0.66	0.66	0.59	0.61	0.57	0.57	0.55	0.50	0.55	0.54	0.50	0.51	0.52	0.51	0.49
2	4	35	0.43	0.58	0.46	0.41	0.42	0.49	0.40	0.40	0.52	0.41	0.38	0.40	0.36	0.31	0.34	0.39	0.35	0.38	0.29	0.34	0.31	0.34	0.35	0.32
2	5	36	0.39	0.36	923.	2.39	3209	2661	364.	16.6	0.33	0.27	0.32	0.34	0.32	0.33	0.31	0.33	0.30	0.29	0.31	0.29	0.30	0.30	0.26	0.29
2	6	37	0.32	0.30	0.31	0.27	0.29	0.30	0.30	0.34	0.29	0.32	0.28	0.31	0.32	0.31	0.29	0.26	0.34	0.27	0.32	0.26	0.32	0.31	0.34	0.28
2	7	38	0.25	0.30	0.26	0.35	0.27	0.32	0.32	0.37	0.34	0.29	0.30	0.30	0.32	0.32	0.29	0.32	0.30	0.32	0.27	0.31	0.28	0.30	0.31	0.31
2	8	39	0.30	0.27	0.30	0.27	0.32	0.30	0.29	0.26	0.37	0.31	0.31	1493	782.	0.29	0.29	0.29	0.33	0.29	0.33	0.30	0.31	0.37	0.37	0.28
2	9	40	0.27	0.33	0.31	0.31	0.31	0.32	0.32	0.25	0.29	0.32	0.34	0.29	0.26	0.28	0.35	0.29	0.37	0.31	0.30	0.30	0.26	0.33	0.28	0.29
2	10	41	0.27	0.35	0.33	0.32	0.29	0.32	0.33	0.23	0.28	0.29	0.27	0.30	0.25	0.28	0.30	0.28	0.30	0.29	0.31	0.28	0.33	0.28	0.29	0.29
2	11	42	0.31	0.34	0.32	0.27	0.36	0.30	0.25	0.26	0.28	0.29	0.31	0.31	0.30	0.33	0.30	0.33	0.30	0.30	0.33	0.29	1575	57.1	182.	26.1
2	12	43	0.71	0.28	0.30	0.31	0.29	0.31	0.30	0.29	0.30	0.31	0.31	0.33	0.31	0.29	0.31	0.28	0.30	0.29	0.30	0.33	0.29	0.28	0.30	0.29
2	13	44	0.28	0.30	0.28	0.32	0.29	0.28	0.31	0.35	0.32	0.30	0.31	0.30	0.25	0.27	0.31	0.32			0.30		0.24	0.28	0.29	0.27
2	14	45	0.27	0.26	0.29	0.32	0.27	0.29	0.28	0.30	0.31	0.31	0.28	0.26	0.27	0.31	0.29	0.33	0.30	0.29	0.30	0.30	0.33	0.33	0.30	0.30
2	15	46	0.30	0.29	0.23	0.30	0.34	3302	0.44	0.33	0.29	0.30	0.32	0.28	0.29	0.31	0.35	0.29	0.32	0.30	0.29	0.33	0.31	0.34	0.32	0.30
2	16	47	0.32	0.30	0.29	0.28	0.37	0.35	0.29	0.31	0.33	0.41	0.36	0.35	0.33	0.35	0.37	0.30	0.35	0.38	0.35	0.35	0.36	0.39	0.43	0.36
2	17	48	0.37		0.38	0.36	0.35	0.34	0.32	0.37	0.39	0.39	0.33	0.32	0.31	0.37	0.32	0.32	0.32	0.31	0.33	0.35	0.39	0.27	0.31	0.30
2	18	49	0.32	0.35	0.34	0.27	0.34	0.31	0.31	0.31	0.35	0.42	0.34	0.34	0.46	111.	4127	0.37	0.42	0.33	0.45	0.52	0.27	0.35	40.2	0.39
2	19	50	0.38	0.35	0.34	0.35	0.35	0.34	0.31	0.32	0.32	0.30	0.33	0.29	0.30	0.34	0.30	0.35	0.37	0.34	0.33	0.36	0.32		0.32	0.27
2	20	51	0.32	0.32	0.29	0.29	0.30	0.33	0.33	0.28	0.30	0.31	0.27	0.31	0.28	0.30	0.35	0.38		0.26	0.35	0.22	0.33		0.33	0.31
2	21	52	0.30	0.35	0.30	0.30		0.32	0.29	0.27	0.28	0.32	0.27	0.34	0.32	0.27	0.32	0.31	0.25	0.29	0.34	0.36	0.31	0.31	2286	446.
2	22	53	6170	1557	86.3	3.53	0.66	0.32	0.30	0.29	0.33	0.32	0.32	0.28	0.33	0.33	0.32	0.36	0.29	0.36	0.34	0.35	0.29	0.34	0.35	0.30
2	23	54	0.35	0.31	0.34	0.32	0.34	0.33	0.31	0.29	0.33	0.28	0.33	0.38	0.29	0.35	0.32	0.31	0.32	0.33	0.29	0.34	0.33	0.27	0.30	0.29
2	24	55	0.37	0.35	0.33	0.34	0.37	0.31	0.32	0.29	0.30	0.34	0.28	0.29	0.31	0.34	0.36	0.29	0.30	0.31		0.36	0.28	0.30	0.28	0.28
2	25	56	0.29	0.37	0.29	0.29	0.31	0.30	0.32	5329	0.37	0.29	0.31	0.30	0.30	0.30	0.36	0.29	0.28	0.28	0.31				0.31	0.30
2	26	57	0.29	0.27	0.28	0.31	0.28	0.27	0.32	0.31	0.31	0.29	0.28	0.31	0.32	0.28	0.49	0.44	0.45	0.38	0.38	0.44	0.41	0.47	0.39	0.44
2	27	58	0.42	0.40	0.42	0.42	0.40	0.37	0.37	0.36	0.39	0.36	0.35	0.32	0.38		0.36	0.31	0.31	0.34	0.33	0.34	0.36	0.35	0.36	0.30
2	28	59	0.33	0.36	0.30	0.29	0.33	0.30	0.33	0.32	0.35	0.32	0.31	0.30	0.33	0.31	0.37	208.	984.		1.81	10.0	5.13	1.57	0.41	0.35

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

FEBRUARY 1970



SOLAR WIND
VELA 3 & 5

FEBRUARY 1970

DATE	UT	Spacecraft	Velocity V_{H+} (km/sec)	Density N_{H+} (cm^{-3})
20	0400	3	327	--
24	1500	3	390	--
	1600	3	455	--
	1800	3	541	--
25	0300	3	493	--
	0500	3	455	--
	0800	3	412	--
	0900	3	390	--
	1600	3	380	--
	2300	3	390	--

SOLAR WIND VELOCITY
and
CO-ROTATION DELAY TIMES

FEBRUARY 1970

NASA Ames Research Center

DATE February 1970	PIONEER VI				PIONEER VII			
	Time (Z)	Pass	U_{H^+}	TAU	Time (Z)	Pass	U_{H^+}	TAU
19	G2315	1527	340.1	7.28	G2134	1283	372.8	8.54
20								
21	G2328	1529	295.1	7.29	G1931	1285	281.4	8.48
22	G2324	1530	284.2	7.30	G1857	1286	323.4	8.53
23								
24	G2312	1532	453.1	7.26	G1957	1288	377.6	8.60
25								
26					G1957	1290	414.1	8.65
27	G0014	1534	393.6	7.27				
28	G2334	1536	460.0	7.26	G1953	1292	323.1	8.61

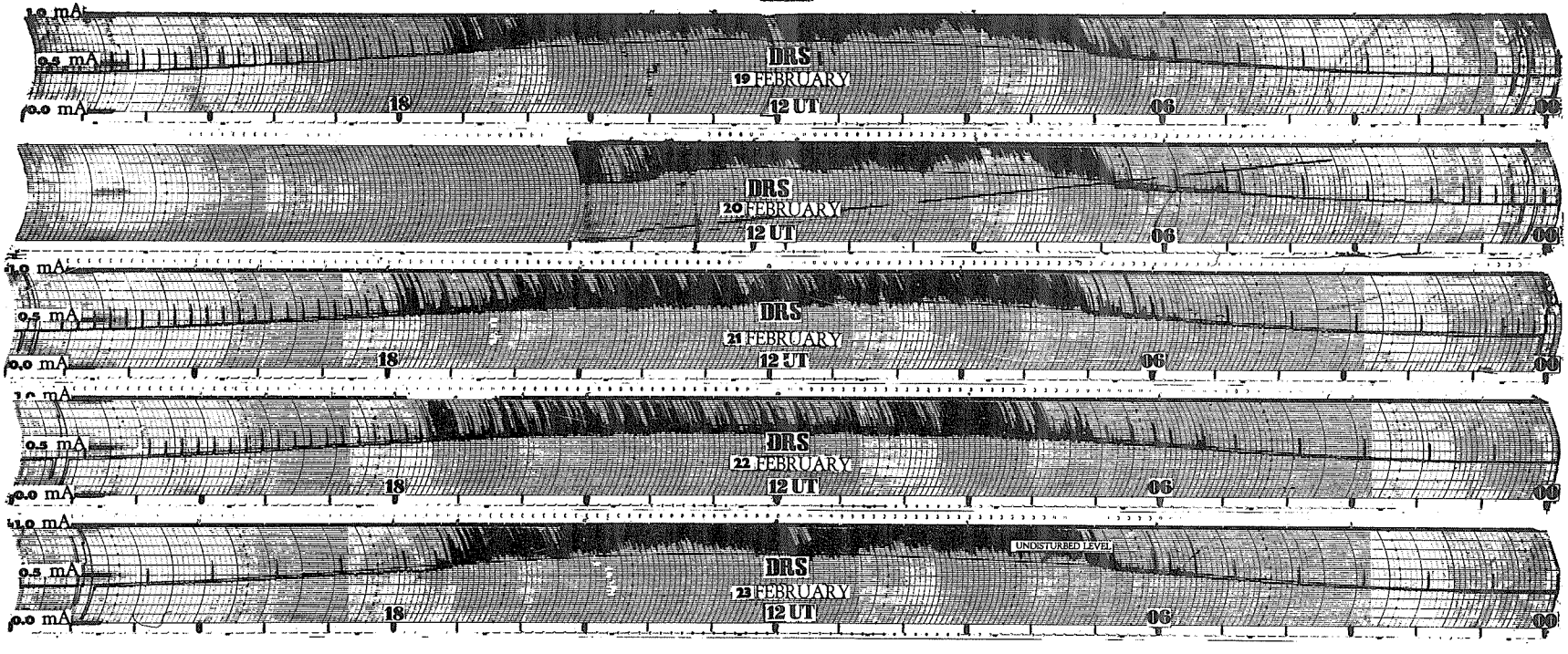
SOLAR WIND

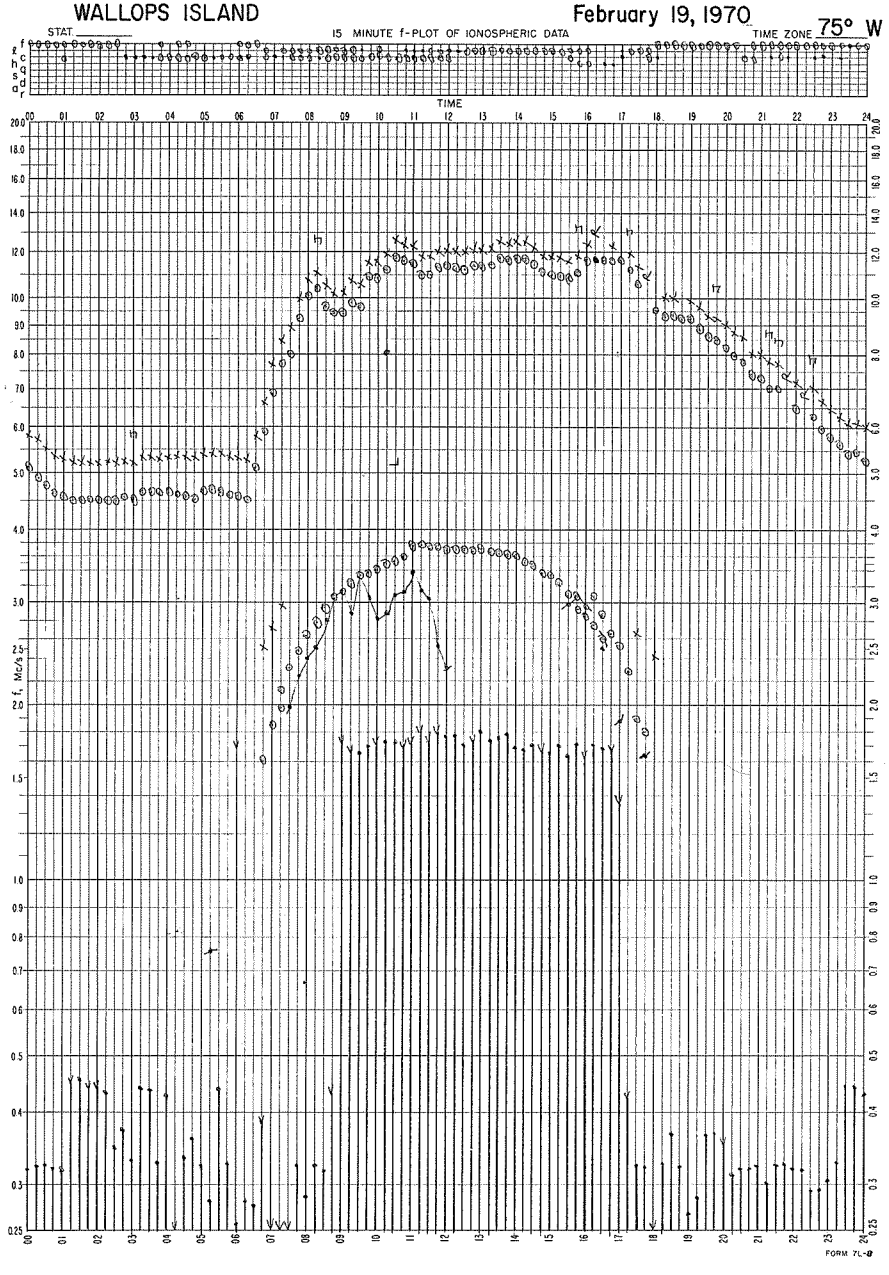
FEBRUARY 1970

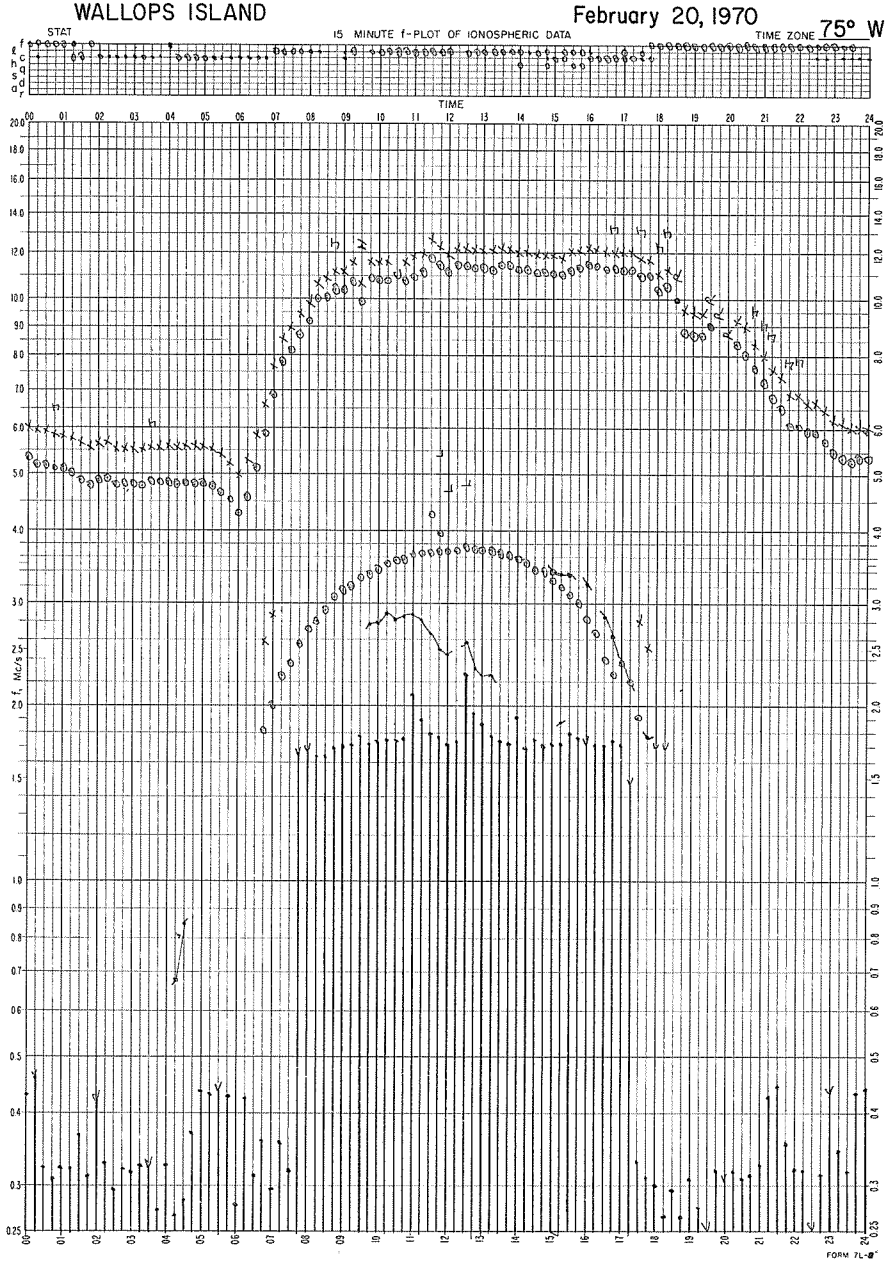
Plasma Data from Pioneer 6 (MIT)

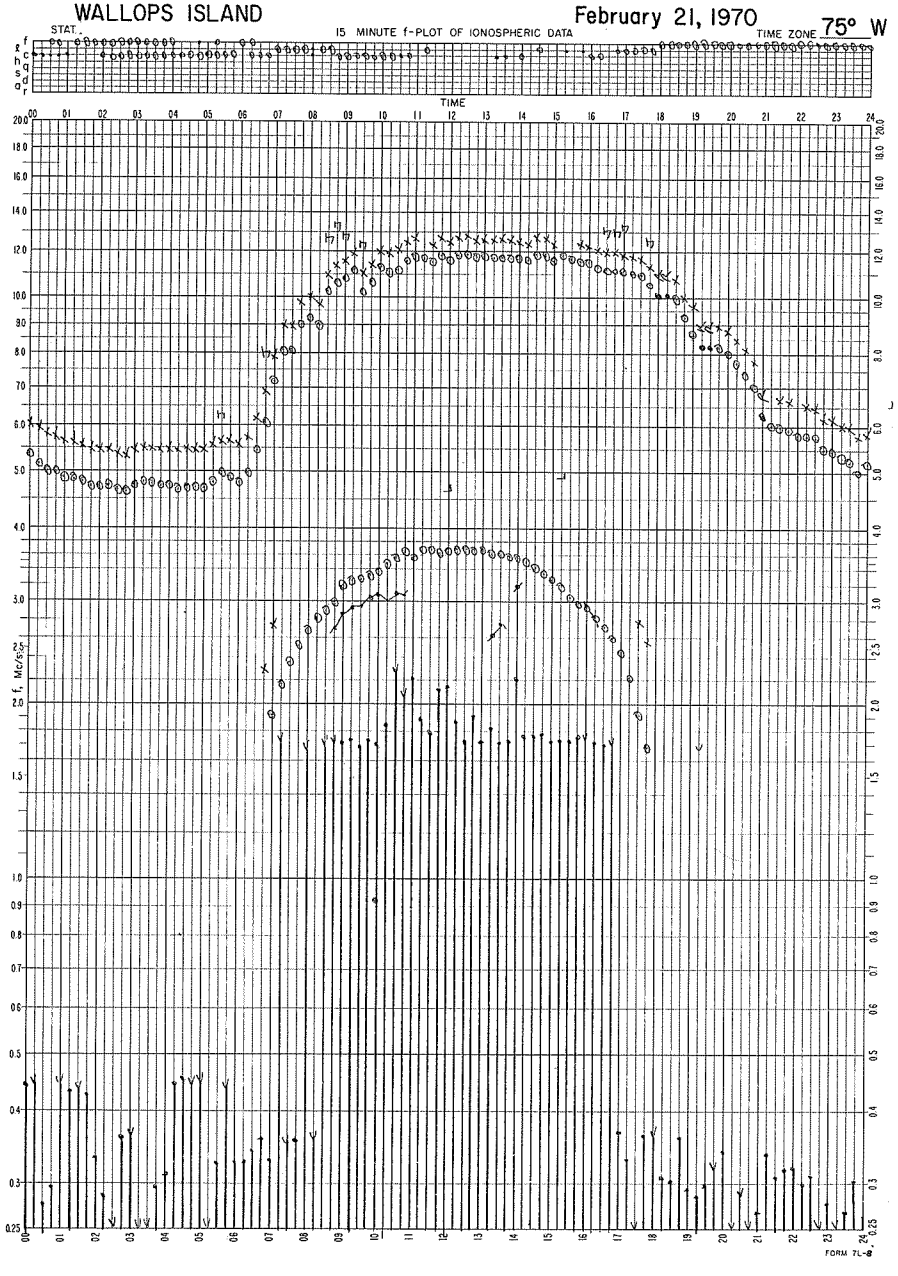
Time Observed	Speed (Up) (km/sec)	Std. Dev.	Density (Np) (Protons/cm^3)	Std. Dev.	Expected at Earth	No. of Obs.
FEB 7.9	382.	1.	7.4	0.1	FEB 20.0	2
FEB 8.0	380.	8.	8.1	0.6	FEB 20.1	3
FEB 9.9	587.	3.	6.7	0.3	FEB 21.8	2
FEB 10.0	599.	10.	4.8	1.1	FEB 21.9	2
FEB 11.9	367.	****	4.0	****	FEB 23.9	1
FEB 12.0	367.	9.	3.7	0.2	FEB 24.0	6
FEB 15.0	296.	9.	4.9	0.4	FEB 27.1	6
FEB 15.9	275.	0.	12.4	3.2	FEB 28.0	2
FEB 16.0	275.	1.	9.8	2.6	FEB 28.1	5
FEB 17.9	271.	1.	53.3	10.6	MAR 2.0	2
FEB 18.0	285.	12.	55.7	9.7	MAR 2.0	4
FEB 19.9	350.	1.	9.2	0.0	MAR 3.8	2
FEB 20.0	357.	9.	6.3	1.0	MAR 3.9	4
FEB 21.9	285.	6.	8.9	2.2	MAR 5.9	2
FEB 22.0	290.	6.	8.0	2.3	MAR 5.9	5
FEB 22.9	276.	0.	10.7	0.2	MAR 6.9	2
FEB 23.0	330.	****	16.0	****	MAR 6.9	1
FEB 24.9	478.	1.	7.0	0.1	MAR 8.6	2
FEB 25.0	488.	1.	4.8	0.2	MAR 8.7	3
FEB 26.9	444.	13.	3.5	0.1	MAR 10.6	2
FEB 27.0	441.	****	3.6	****	MAR 10.7	1

KIRUNA, VERTICAL RIOMETER 27.6 MHz
1970

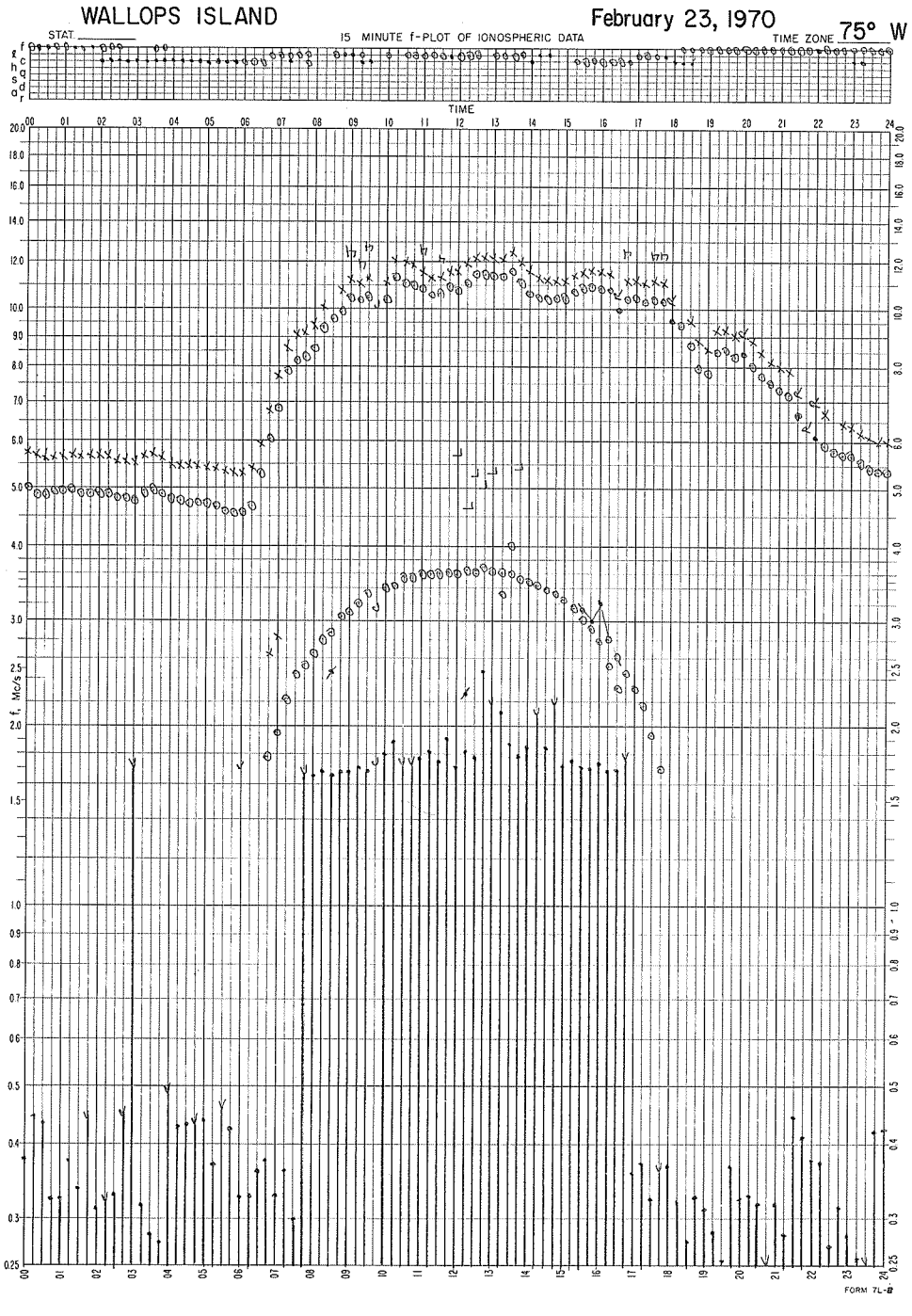


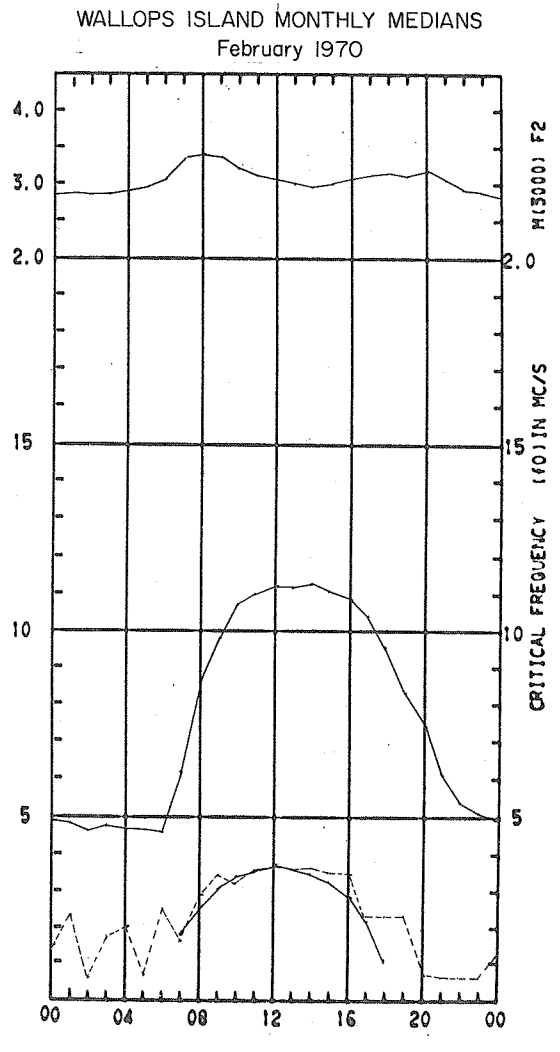

WALLOPS ISLAND
February 19, 1970
STAT.
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
f
h c
s q
a d
r
TIME
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
20.0 18.0 16.0 14.0 12.0 10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.5 2.0 1.5 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.25
f, Mc/s
FORM 7L-8

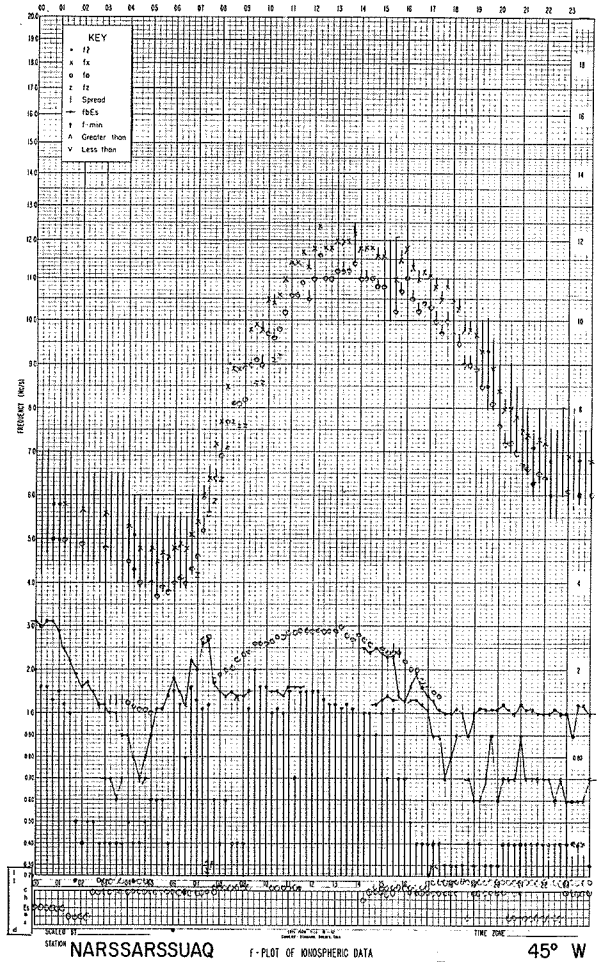

WALLOPS ISLAND
February 20, 1970
STAT
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
f
h c
s q
a d
r
TIME
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
20.0 18.0 16.0 14.0 12.0 10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.5 2.0 1.5 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.25
f, Mc/s
FORM 7L-8


WALLOPS ISLAND
February 21, 1970
STAT.
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
TIME
f, Mc/s
FORM 7L-8

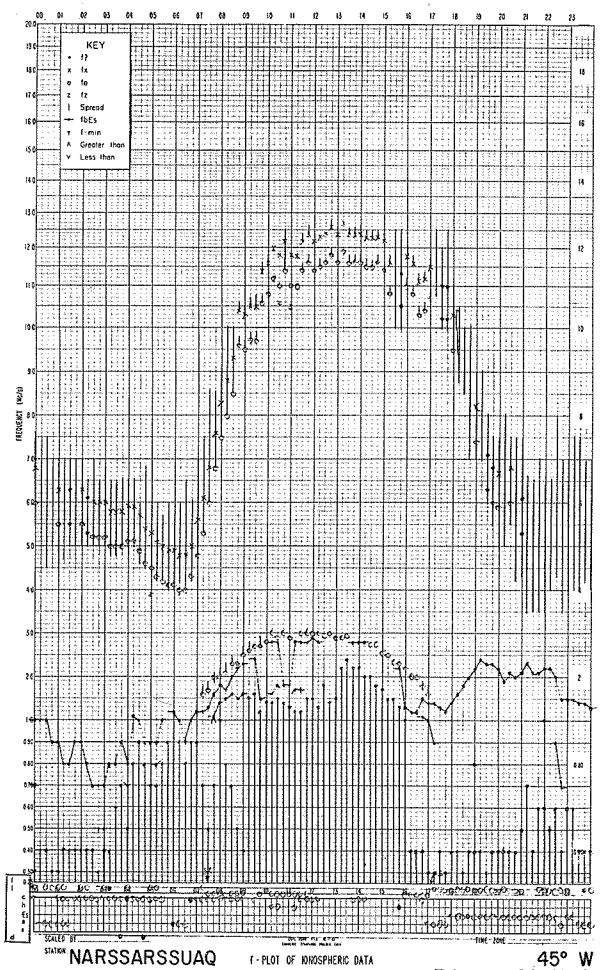

WALLOPS ISLAND
February 22, 1970
STAT.
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
TIME
f, Mc/s
FORM 7L-8


WALLOPS ISLAND
February 23, 1970
STAT.
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
TIME
f, Mc/s
FORM 7L-8


WALLOPS ISLAND MONTHLY MEDIANS
February 1970
M(3000) F2
CRITICAL FREQUENCY (fO) IN MC/S



STATION NARSSARSSUAQ f-PLOT OF IONOSPHERIC DATA 45° W
February 19, 1970



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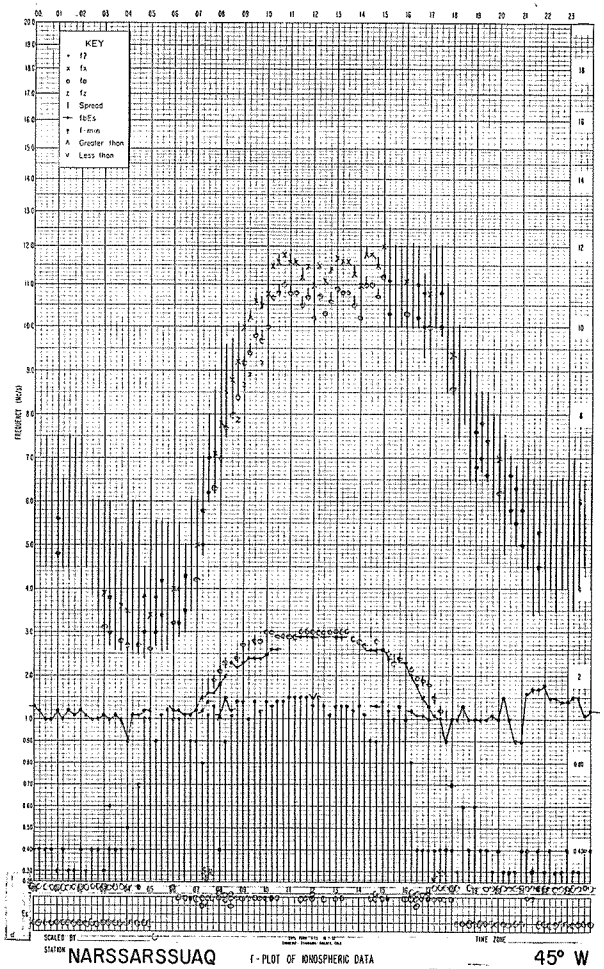
February 20, 1970



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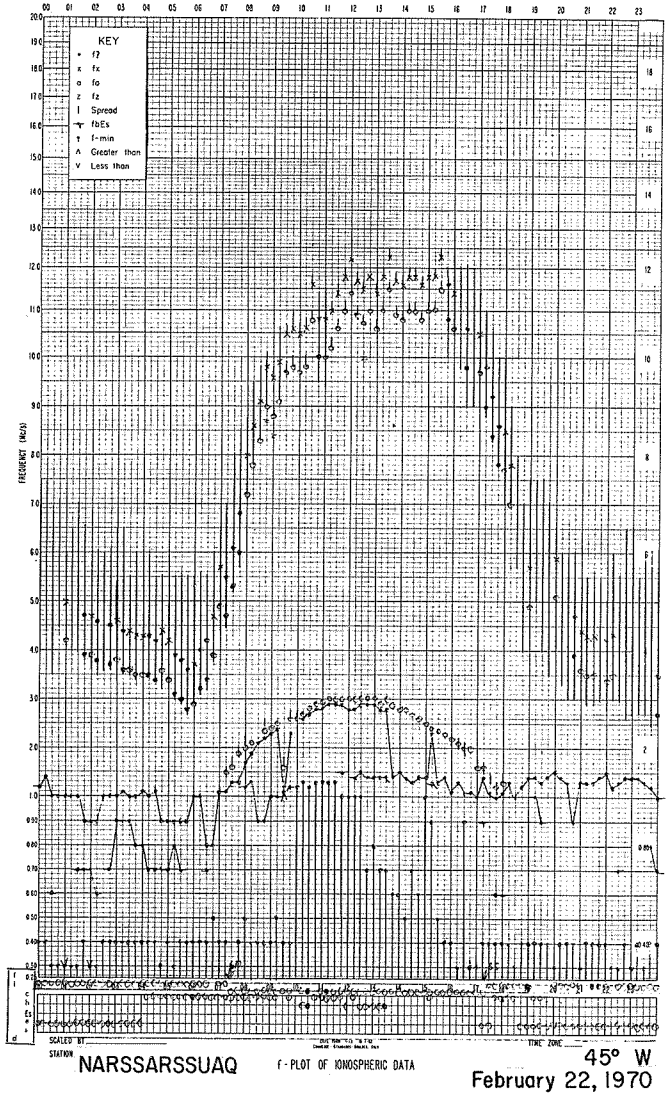
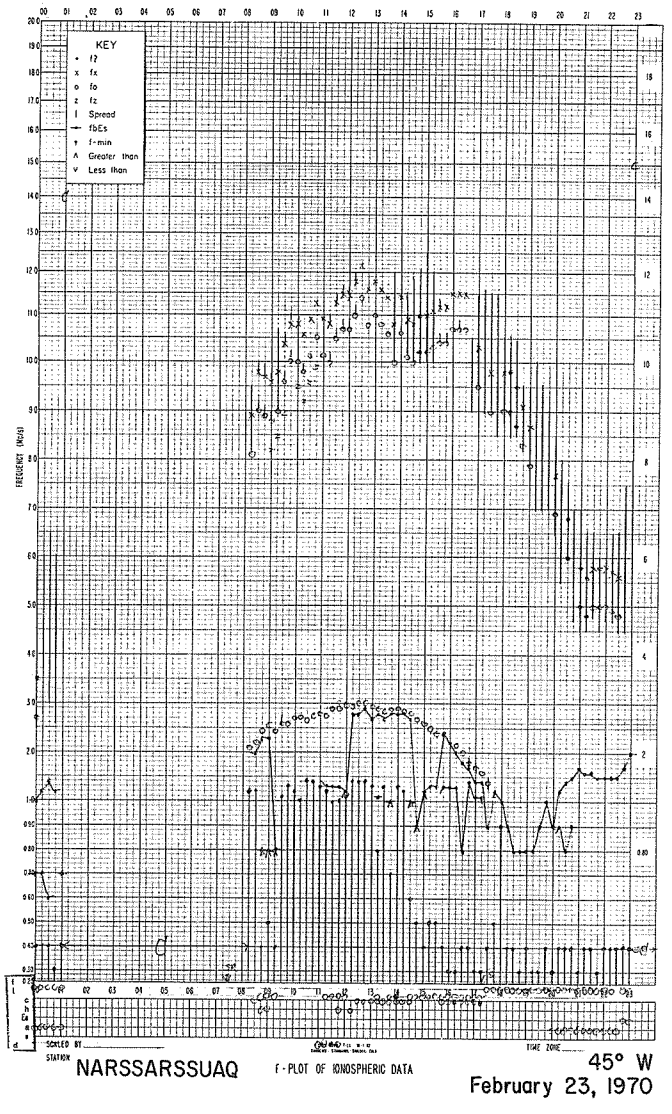
February 21, 1970



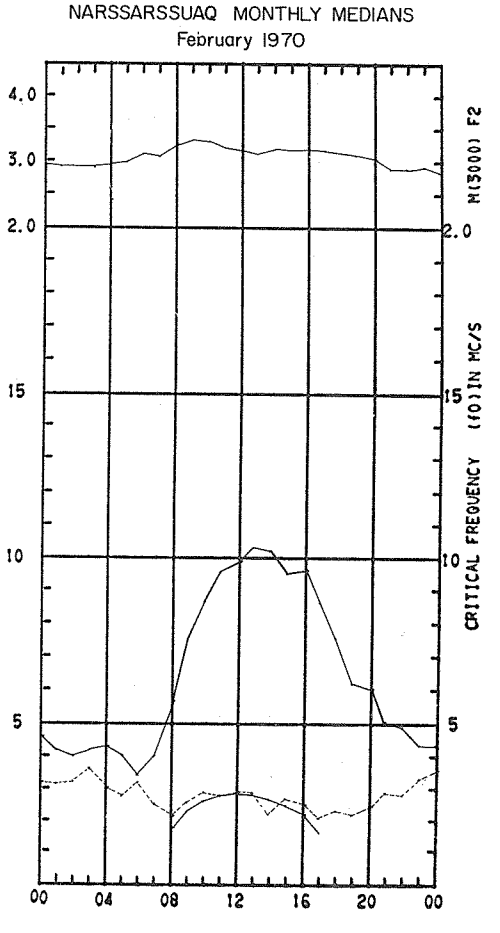
NARSSARSSUAQ f-PLOT OF IONOSPHERIC DATA 45° W

February 22, 1970



NARSSARSSUAQ f-PLOT OF IONOSPHERIC DATA 45° W

February 23, 1970



SUDDEN IONOSPHERIC DISTURBANCES

February 1970

FEB 1970	UNIVERSAL TIME				WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE							KNOWN FLARE	REGION
	START	END	MAX	IMP		SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD		
19	0254	0318	0300	1-	1				1				0253	10579
19	0326	0520	0342	2-	5	1	1		2	5	6		0322	10584
19	0842	0910	0850	1	3	1			1				0841	10579
19	0902	1025	0940	2-	5	5		2	3	1	4		0930	10581
19	1711	1717	1713	1	1							1	1711	10579
19	1749	1829	1759	1	5			2	5	1	1		1747	10581
19	1852	1924	1904	1	1				1	1			1851	10581
19	1924	1958	1934	1	5			2	4	1	1		1921	10581
19	1955	2100	2000	1	5	1		2	5	1	1		1955	10588
19	2322	0020	2328	1	5				4	3	2		2322	10581
20	0420		0422	1	3					2	2		0419	10581
20	0942	1350	1000	2+	5	6	2	4	4		2		0944	10584
20	1518		1530	2-	3					2	2		1519E	10579
20	1717	1835	1729	1+	5	2		3	5	2	2		1717	10579
20	2329	0010	2343	1-	3				2	1	1		2330	10584
21	0938	1050	0954	1	1			1	1				0933E	10584
21	1601	1650	1603	1	5			3	4	1	1		1600	10595
21	1848	2025	1854	1+	5	1		2	6	1	1		1854E	10595
21	2120	2200	2125	1-	3				2				2120	10581
22	0035	0108	0039	1-	3				2	2	2		0033	10592
22	0320	0340	0327	1	1	1							0321	10584
22	1600		1630	1+	3					2			1615	10584
22	1855		1913	1+	1					1	1		1858	10592
22	2306	2330	2320	1-	1				1				2307E	10595
22	2334	2355	2346	1-	1				1				2330	10588
23	0209	0236	0214	1	5	1	1		4			1	0209	10595
23	1455	1510	1459	1-	5				5	1		1	1453	10594
23	1541	1546	1545	1	1							1	1543	10581
23	1722	1742	1727	1-	3				2	1			1719	10581
23	1742	1849	1744	1-	5			3	3	2	2	1	1741	10595
23	1849	1908	1851	1-	3				3	1			1847	10592
23	2156	2220	2159	1-	3				5				2151	10592

STATIONS REPORTING FOR FEBRUARY 1970

AAVSO (A1, A6, A8, A17, A19, A21, A22, A26) (SEA)
(A1, A20, A21) (SES)
ANCHORAGE (AN) (SWF, SCNA, SPA)
ATHENS (AT) (SWF)
ATTU (LORAN-C) (TT) (LF-SPA, SES)
BAHRAIN (BH) (SWF)
BEARLEY (BY) (SWF)
BOULDER (BO) (SCNA, SEA, SFD)
CAPE RACE (LORAN-C) (CP) (LF-SPA, SES)
DARMSTADT (DA) (SWF)
ENKOPING (SW) (SWF, SPA)
FORESTPORT (FP) (SPA)
GESASHI (LORAN-C) (GE) (LF-SPA, SES)
HAWAII (HA) (SPA, SFD)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA)
HOKKAIDO (LORAN-C) (HO) (LF-SPA, SES)
HONGKONG (HK) (SWF)
HUANCAYO (HU) (SWF)
HURBANOVO (HB) (SWF)
INUBO (IN) (SPA)
JUPITER (LORAN-C) (JP) (LP-SPA, SES)
KUHLUNGSBORN (KU) (SEA, SPA)
MANILA (MA) (SWF, SCNA, SPA)
MARCUS (LORAN-C) (MR) (LF-SPA, SES)
MCMATH (MC) (SWF, SCNA)
NANTUCKET (LORAN-C) (NT) (LF-SPA, SES)
NEUSTRELITZ (NU) (SWF, SCNA)
NEW DELHI (ND) (SCNA, SES)
PANSKA VES (PU) (SWF, SEA, SES)
POITIERS (PO) (SEA)
PORT CLARENCE (LORAN-C) (PC) (LF-SPA, SES)
PRESTON (LO) (SEA)
PYRAMID ROCK (PR) (SPA)
ROMF (RO) (SCNA)
SAN DIEGO (SD) (SPA)
SANDUR (LORAN-C) (SA) (LF-SPA, SES)
SAO PAULO (UM) (SPA, SES)
SITKINAK (LORAN-C) (SK) (LF-SPA, SES)
SLOUGH (SL) (SPA)
SOMERTON (SO) (SWF)
SYLT (LORAN-C) (ST) (LF-SPA, SES)
TABLE MOUNTAIN (TM) (SWF, SPA, LF-SPA)
TOYOKAWA (TY) (SEA)
TRINIDAD (TR) (SWF, SPA)
UCCLE (UC) (SEA)
WHITE SANDS (WS) (SWF)
YAP (LORAN-C) (YP) (LF-SPA, SES)
ROME (RO) (SCNA, SEA)

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
19	0301-0404 TM, 1530-1800 SW
20	0348-0414 TM, 1325-1750 SW,
	1410-1430 SL
21	0924-1620 TM, 1030-1700 SW
23	1546-1555 TM

SID's BY McMATH REGION

Feb. 1970	79	81	84	86	88	89	92	94	95
19	3	5	1		1				
20	2	1	2						
21		1	1						2
22			2		1		2		1
23		2					2	1	2

COSMIC RAY INDICES
(Neutron Monitors)

FEBRUARY 1970

Feb. 1970	CHURCHILL DAILY AVERAGE COUNTS PER HOUR	DEEP RIVER DAILY AVERAGE COUNTS PER HOUR	CLIMAX DAILY AVERAGE COUNTS PER HOUR	DALLAS DAILY AVERAGE COUNTS PER HOUR
1	*	6346.4	3769.5	*
2		6328.2	3762.9	
3		6328.7	3749.3	
4		6356.7	3746.5	
5		6379.6	3775.6	
6		6409.4	3798.4	
7		6429.6	3812.0	
8		6452.1	3815.5	
9		6485.2	3830.8	
10		6448.0	3823.4	
11		6440.1	3825.2	
12		6478.6	3829.4	
13		6452.1	3797.2	
14		6424.1	3797.5	
15		6435.6	3813.0	
16		6463.9	3830.5	
17		6483.0	3843.6	
18		6485.5	3860.2	
19		6513.0	3865.7	
20		6530.7	3861.5	
21		6539.7	3870.4	
22		6545.5	3892.5	
23		6570.3	3900.9	
24		6511.7	3861.2(38)	
25		6450.7	3813.8(22)	
26		6474.0	3837.2(20)	
27		6466.1	3837.7(38)	
28		6488.0	3856.4	

( ) Number of hours for which data are available if less than 24 (or number of section hours if less than 40 for Climax).

Deep River Neutron Monitor, Scaling Factor 300.

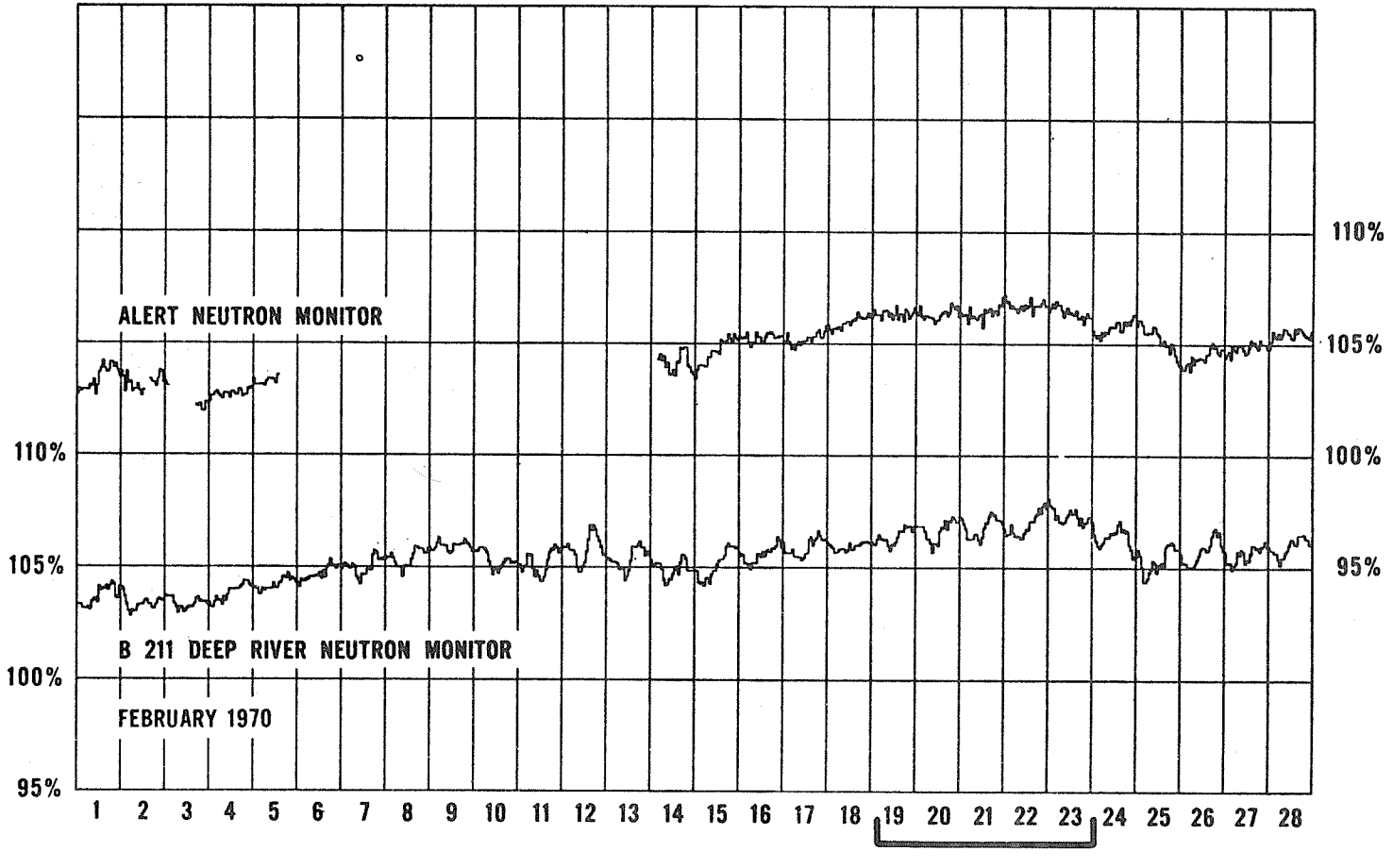
Climax IGC Station B305, Scaling Factor 100.

* Dallas and Churchill observations for February 1970 are not available.

COSMIC RAY INDICES

(Pressure Corrected Hourly Totals)

FEBRUARY 1970



FEBRUARY 1970 AE INDICES

VALUES ARE EXPRESSED IN GAMMAS

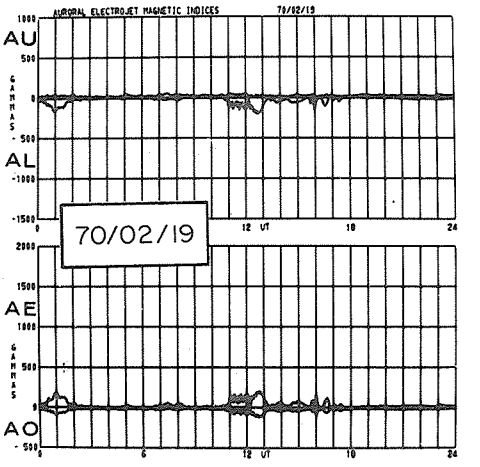
	UT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
	1	40	122	130	61	200	162	63	26	14	17	14	16	21	35	33	36	45	48	41	37	46	94	279	422	83
D	2	281	97	70	181	323	197	203	178	184	300	311	442	473	227	46	61	160	336	368	506	422	270	330	534	271
	3	261	244	101	78	117	51	28	41	35	45	127	138	197	67	32	57	28	24	26	22	14	25	27	22	75
D	4	22	41	30	33	27	30	76	92	207	376	156	201	315	474	380	180	369	597	370	195	169	232	131	133	202
	5	106	153	178	208	160	140	53	42	65	60	62	76	203	382	320	121	121	149	77	52	86	125	298	246	145
	6	121	68	50	54	76	63	32	125	99	88	30	22	22	20	23	24	26	47	79	85	34	20	14	16	52
Q	7	19	20	17	15	12	16	17	19	21	27	24	26	20	29	25	20	16	13	14	26	25	23	24	16	20
Q	8	21	19	19	21	18	21	21	24	24	27	25	19	27	49	74	106	125	131	71	101	73	53	32	24	47
	9	21	22	41	46	21	42	68	48	31	31	25	33	43	45	110	193	134	119	79	36	34	29	25	24	54
	10	24	21	19	24	46	33	72	54	40	21	18	16	24	49	108	417	491	476	394	58	63	47	52	43	109
Q	11	30	25	24	19	27	32	33	61	112	63	28	20	29	30	28	57	96	78	50	37	24	43	39	32	42
	12	26	31	22	19	19	14	16	17	18	24	23	22	23	36	31	40	43	41	42	29	26	30	31	29	27
	13	23	25	25	26	36	64	28	28	21	27	26	40	138	222	188	38	32	26	34	22	24	21	27	29	49
D	14	35	39	109	355	218	199	64	44	45	100	324	427	156	170	289	332	283	166	50	40	40	42	34	38	150
	15	38	47	123	114	153	230	253	217	142	126	346	163	38	47	69	155	96	177	258	216	60	38	47	48	133
	16	40	35	38	34	24	33	40	164	178	96	82	176	218	188	304	139	40	32	31	33	35	65	97	85	92
	17	32	25	33	32	27	24	15	18	23	40	201	172	75	40	37	74	252	506	491	555	378	324	286	156	159
	18	69	92	129	91	205	94	78	198	132	85	60	76	63	282	528	188	53	56	185	84	99	83	205	149	137
	19	93	117	35	22	20	28	27	52	37	27	36	134	165	61	63	66	61	30	27	35	34	41	35	45	54
	20	35	28	21	24	24	24	23	22	22	31	41	38	43	52	218	189	65	47	34	85	44	31	32	30	50
Q	21	28	22	34	30	17	29	28	41	50	42	29	31	36	35	29	27	26	32	20	22	51	31	28	39	32
Q	22	27	31	33	34	23	20	25	24	23	25	31	26	37	48	34	40	35	33	61	85	60	34	32	31	36
	23	26	24	22	21	16	16	23	22	20	23	26	30	36	31	29	32	29	36	27	22	32	31	28	26	26
D	24	21	22	32	131	31	20	32	159	148	34	150	99	38	40	62	211	832	714	316	83	88	39	37	37	141
	25	34	51	48	24	15	41	65	53	28	29	29	26	29	26	31	54	97	93	31	25	16	22	26	22	38
	26	33	103	162	125	136	183	254	373	331	349	511	536	664	674	525	323	77	109	44	25	20	37	29	34	236
	27	31	25	21	23	42	92	121	182	225	215	227	271	148	210	162	81	132	238	78	66	202	475	353	397	167
D	28	487	508	397	108	57	150	207	303	339	159	256	463	483	418	184	188	308	386	459	216	56	111	78	265	274
	MEAN	72	73	70	70	75	73	70	94	93	89	115	134	134	142	142	123	145	169	134	100	81	86	95	106	104
5Q	MEAN	25	23	25	24	19	24	25	34	46	37	27	24	30	38	38	50	60	57	43	54	47	37	31	28	35
5D	MEAN	169	141	128	162	131	119	116	155	185	194	239	326	293	266	192	194	390	440	313	208	155	139	122	201	208

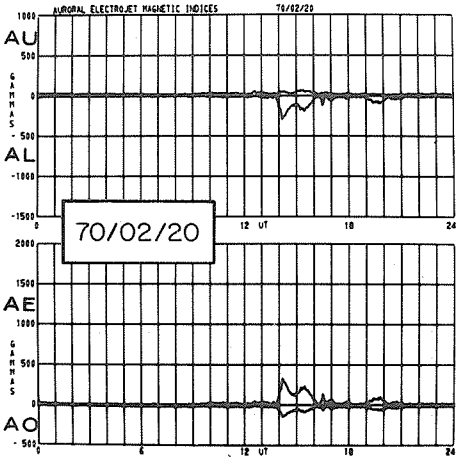
AU Upper envelope formed by connecting successive extreme high ΔH values

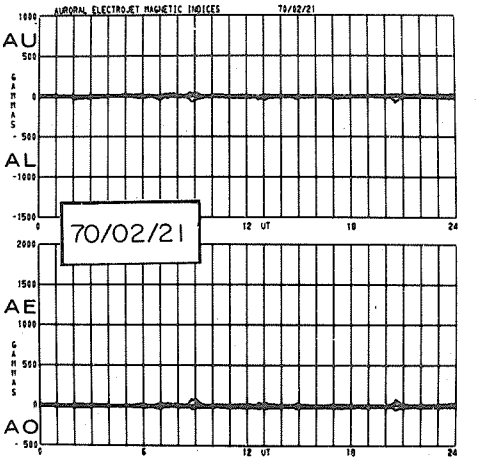
AL Lower envelope formed by connecting successive extreme low ΔH values

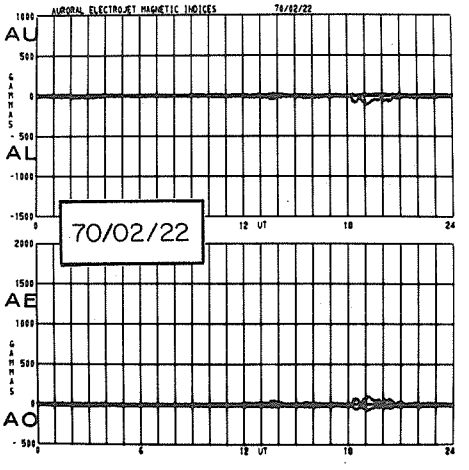
AE Auroral Electrojet index = AU - AL

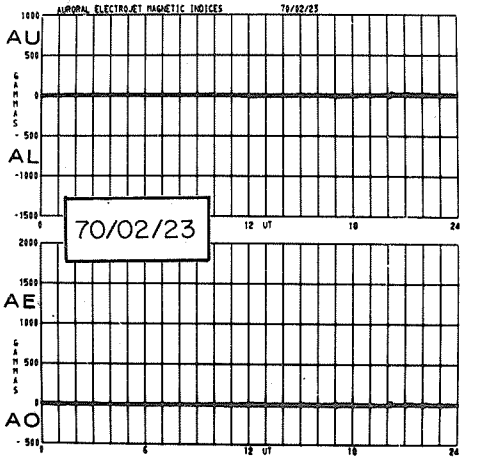
AO Mean value (AU+AL)/2











Daily graphs of 2.5-min Auroral Electrojet Magnetic Indices AU, AL, AE and AO for February 19-23, 1970.

Hourly Equatorial Dst Values (Provisional)

FEBRUARY 1970

UNIT=GAMMAS

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	G.M.T. 24
1	4	4	4	-1	-4	-1	7	5	6	8	10	10	13	16	18	21	22	20	20	18	22	23	19	9
2	11	9	7	0	-3	-2	2	-0	5	6	-2	-10	-9	-1	3	5	3	3	-2	-9	-15	-10	-5	-11
3	5	6	2	-4	-6	-8	-6	-4	-3	-1	-2	-2	-1	0	1	3	3	2	2	4	6	7	9	11
4	11	11	8	4	5	3	4	6	-0	-5	-4	0	4	8	4	3	1	-7	-6	-9	-9	-7	-4	-1
5	3	5	-2	-8	-13	-9	-7	-5	-4	-4	-3	-1	2	2	4	2	2	0	2	2	3	4	1	2
6	5	6	5	1	-4	-3	-3	-5	-4	-2	-0	2	5	7	9	12	13	12	10	7	4	3	4	8
7	13	12	8	4	2	2	1	0	2	3	3	3	4	3	1	1	0	2	5	5	5	8	8	8
8	11	9	6	3	5	9	9	9	9	11	12	12	12	12	13	14	15	14	14	13	12	11	11	11
9	12	10	7	4	5	6	6	9	9	9	10	12	14	13	11	13	14	16	19	22	24	23	21	25
10	26	22	17	13	8	6	6	5	8	12	13	15	17	17	21	26	21	11	5	5	7	5	3	4
11	7	9	7	4	4	5	7	9	8	4	2	5	8	8	10	11	9	7	4	3	5	7	4	-3
12	-6	-6	-0	4	7	9	9	10	12	13	13	16	20	20	21	24	27	27	20	18	20	20	17	13
13	7	6	6	8	9	10	16	20	23	21	19	22	26	29	30	34	36	35	27	23	22	22	21	17
14	15	13	9	-6	-18	-17	-11	-7	-4	-0	-2	-0	2	5	5	6	4	3	3	4	3	5	6	6
15	7	-1	-8	-16	-16	-16	-18	-16	-13	-8	-6	3	7	8	7	11	12	9	11	16	18	22	22	17
16	18	21	17	12	9	9	9	8	8	9	10	11	13	11	10	10	12	14	15	14	15	15	12	11
17	13	13	10	6	9	12	14	16	16	16	12	10	14	18	20	21	23	24	9	2	-4	-6	-6	-4
18	-1	-1	-2	-3	-6	-9	-10	-8	-4	-2	-0	2	3	5	9	7	9	10	11	9	5	5	0	-0
19	4	7	8	4	4	5	5	4	3	6	5	5	7	8	10	12	12	12	13	14	12	10	11	15
20	17	21	20	16	15	13	12	11	10	11	11	12	10	6	8	10	13	14	13	9	6	4	6	9
21	13	14	16	17	16	12	10	11	13	12	12	11	12	11	8	8	7	7	10	10	10	14	14	14
22	15	16	16	19	17	17	15	14	13	14	14	15	15	14	13	14	14	15	17	21	17	15	16	19
23	19	23	24	24	22	19	20	21	20	21	21	23	26	27	27	27	28	28	26	28	36	36	32	29
24	31	29	25	23	18	19	21	20	18	21	24	25	26	30	35	19	29	31	17	18	12	5	4	6
25	9	13	13	13	10	14	14	15	15	13	9	8	11	13	14	16	16	19	21	18	15	14	15	13
26	9	8	5	-0	-7	-9	-12	-16	-15	-17	-18	-20	-22	-21	-24	-18	-15	-12	-11	-16	-17	-15	-13	-11
27	-11	-11	-12	-16	-17	-18	-12	-15	-15	-16	-18	-19	-14	-12	-12	-8	-6	-6	-4	5	4	-5	-9	-16
28	-26	-28	-26	-23	-17	-19	-20	-20	-23	-17	-16	-14	-16	-19	-15	-12	-6	-6	-3	-0	-1	-0	-2	-5

GEOMAGNETIC ACTIVITY INDICES

FEBRUARY 19-23, 1970

DAY		K_p THREE-HOUR RANGE INDICES 1 2 3 4 5 6 7 8	SUM	C_i	C_p	A_p
19		2 1- 1+ 1+ 1+ 1 1- 1-	9	0.1	0.2	4
20	Q	0+ 0 0+ 1 2- 1 1- 1-	6-	0.0	0.1	3
21	QQ	0+ 0 1- 1 0+ 0+ 1- 0+	4	0.0	0.0	2
22	QQ	0+ 0+ 0+ 0+ 0+ 0+ 1- 1-	3+	0.0	0.0	2
23		1 0+ 0+ 0 1- 1- 3- 1	7-	0.2	0.1	4
			MEAN	.36	.32	7

A preliminary storm sudden commencement (ssc) occurred on February 23 at 2013 UT.

PRINCIPAL MAGNETIC STORMS

FEBRUARY 1970

DATE 1970 MO. DA.	STORM TIME UT START	STORM TIME UT END MO DA HR	OBS.	GEO-MAG. LAT.	SUDDEN COMMENCEMENT TYPE	AMPLITUDES D(')	AMPLITUDES H(γ)	AMPLITUDES Z(γ)	C FIGURE DEGREE OF ACTIVITY	MAXIMAL ACTIVITY ON K-SCALE 0 TO 9 MO DA	3-HOUR PERIOD	K INDEX	RANGES D (')	RANGES H (γ)	RANGES Z (γ)	STORM NUMBERS
02 01	1956	02 03 08	HYDE	7.6N	SC	- 0.1	+ 1.0	- 1	M	02 02	8	4	2	54	24	5
	1957	02 02 03	NEWP	55.1N	SC	2	9	--	M	02 02	4,5,8	4	16	72	70	5
	1957	02 03 14	KGLN	57.3S	SC	--	--	--	M	02 02	7,8	4				5
02 13	0245	02 13 20	HYDE	7.6N	..	..	..	..	M	02 03	2,5	3	2	59	22	6
02 23	2012	02 25 09	HYDE	7.6N	SC	- 0.4	+16	- 1	M	02 24	6,7	4	4	123	14	7
02 24	1337	02 24 19	ALIB	9.5N	SC	--	+ 9	--	M	02 24	6	5	1	72	11	7
	1337	-- -- --	HYDE	7.6N	SC	0	+ 8	- 1								7
	1337	02 24 19	ANNA	1.5N	SC	- 0.3	+11	+ 7	M	-- --	-	-	1	72	17	7
	1337	02 24 19	TVAN	1.1S	SC	+ 0.1	+ 9	+12	M	-- --	-	-	1	71	37	7

The following observatories reported that no principal magnetic storms occurred in February 1970: Amberley, Apia, Boulder, Fredericksburg, Gnangara, Guam, Hermanus, Honolulu, Irkutsk, M'Bour, Port Moresby, San Juan, Sitka, Toolangi, Tucson and Witteveen.

SUDDEN COMMENCEMENTS AND SOLAR-FLARE EFFECTS

February 19-24, 1970

Preliminary Report of Sudden Commencements

These reports are provided by Dr. A. Romana for the International Association of Geomagnetism and Aeronomy Commission IV: Magnetic Activity and Disturbances.

S.c.'s given by ten or more stations are underlined. Times are mean values obtained from normal magnetograms. When the names of the observatories are not given, the letters in square brackets indicate the quality of the observations.

Sudden commencements followed by a magnetic storm or a period of storminess (s.s.c.)

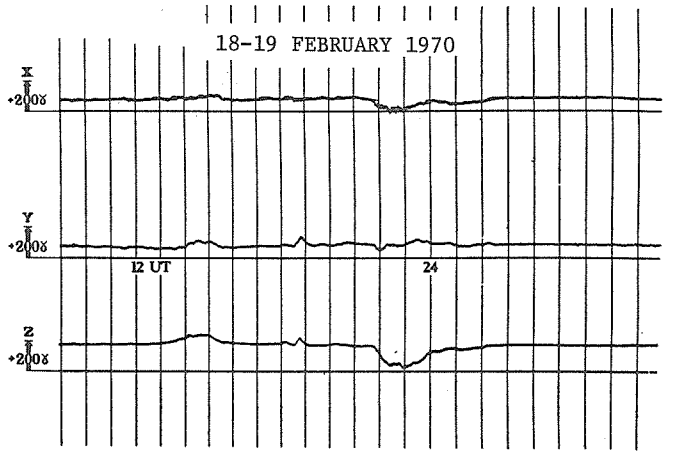
1970 February 23d 20h 12m: fifty-three (ssc: 39 [A: 13; B: 25; C: 1]; si: 14 [A:7; B: 6; C:1]).
24d 13h 38m: eighteen (ssc: 14 [A: 3; B: 5; C: 6]; si: 3; bp: 1).

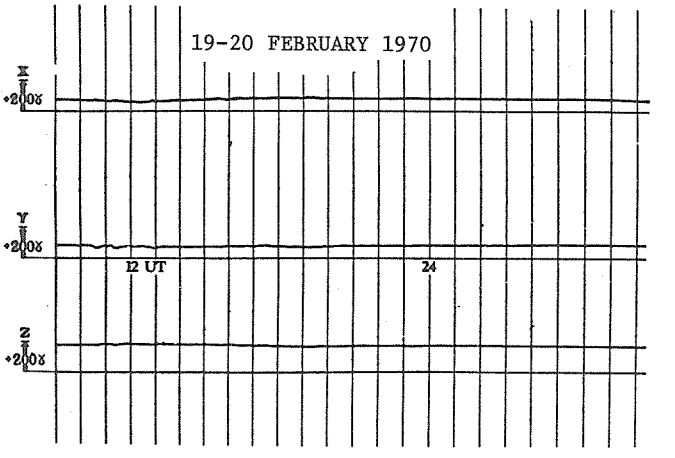
Preliminary report on solar-flare effects (s.f.e.)

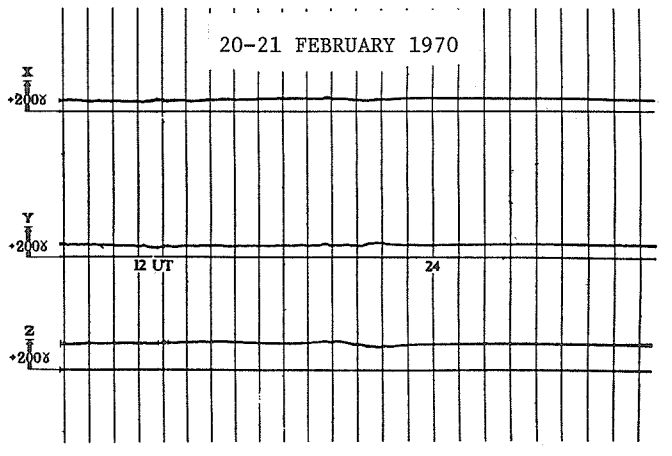
Effects confirmed by ionospheric or solar observations are underlined.

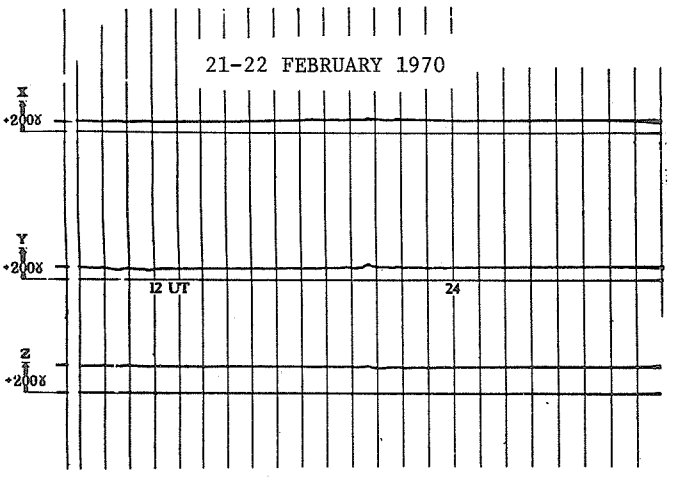
1970 February 19d 09h 33m - 09h 43m: QU.
20d 09h 43m - 10h 30m: HR (si: MC).
24d 08h 55m - 09h 02m: HR (ssc: LM).

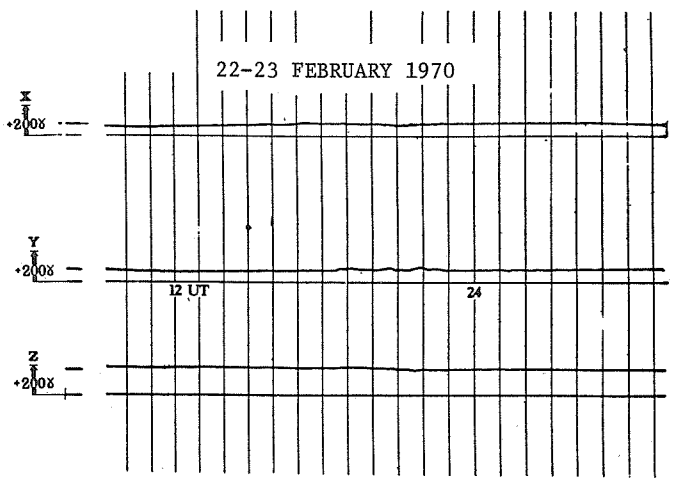
KIRUNA, NORMAL MAGNETOGRAM

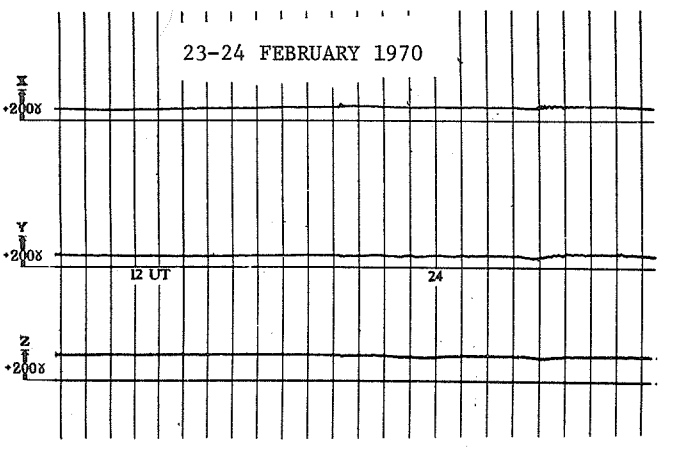












III. NOVEMBER 29 - DECEMBER 3, 1970 PERIOD

Brief Synopsis of Solar Activity

Seven regions passed the Central Meridian during the period November 29 - December 3, 1970; a total of 15 regions were visible on the solar disk. Two confirmed flares of importance ≥1F occurred:

	Imp.	Location	Start Time UT
November 29	1N	N23 E65	0345
December 2	1B	S09 E28	1559

The Abbreviated Calendar Record on page 78 gives a concise but comprehensive solar-geophysical activity synopsis. The format is explained in *Solar-Geophysical Data* Descriptive Text, Number 342 (Supplement), February 1973 issue.

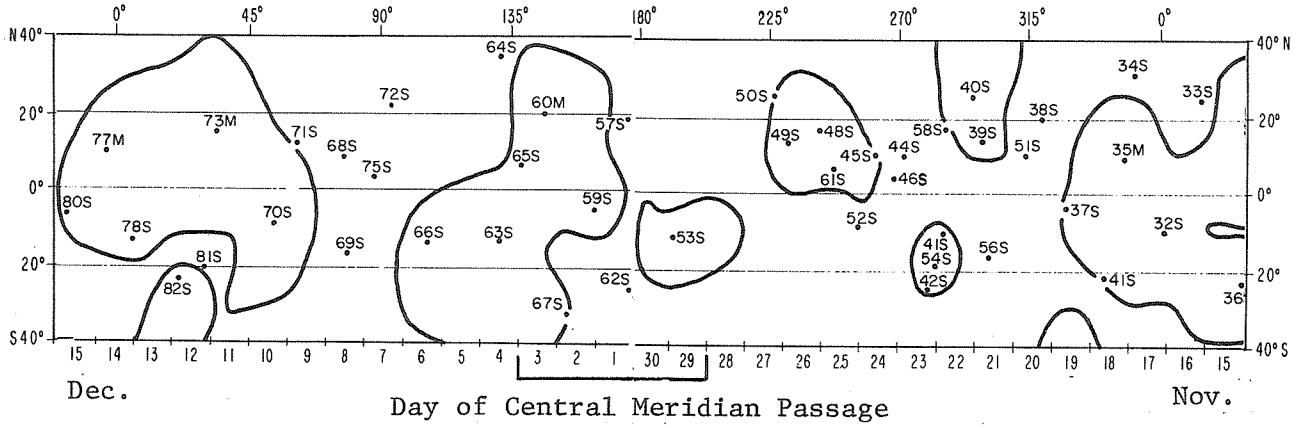
Most of the data published in this report are from *Solar-Geophysical Data*. The explanation of those data is found in *Solar-Geophysical Data* Descriptive Text, Numbers 306, 318, 330 and 342 (Supplement) covering the years 1970, 1971, 1972 and 1973, respectively.

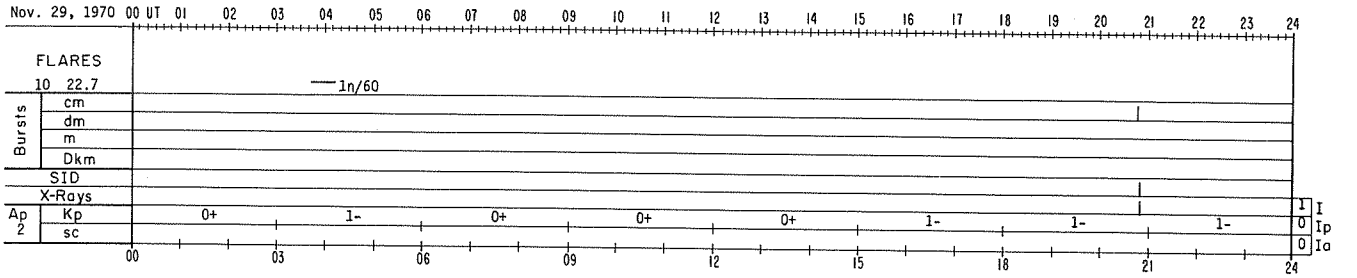
DAILY SOLAR INDICES

1970	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.							
			R_Z	$R_{A'}$	OTTAWA 2800	AFCRL 15400	AFCRL 8800	AFCRL 4995	OTTAWA 2800	AFCRL 2695	AFCRL 1415	AFCRL 606	AFCRL 245
Nov.29	333	20	76	100	152.5	544	248	213	148.4	147.7	108.7	67.6	16.9
30	334	21	101	114	156.9	542	248	207	152.5	152.4	112.9	68.6	13.1
Monthly Mean			91.1	107.5	162.0	549	265	223	158.5	150.3	111.0	67.7	19.6
Dec.01	335	22	88	98	150.6	537	239	209	146.4	145.4	111.9	71.5	10.3
02	336	23	69	89	152.7*	548	242	213	148.4*	149.1	112.1	67.1	12.1
03	337	24	75	80	152.5	535	242	204	148.1	145.5	111.0	68.5	10.9
Monthly Mean			76.6	90.4	152.8	544	250	213	148.0	140.9	111.3	67.4	13.4

*Adjusted for Burst

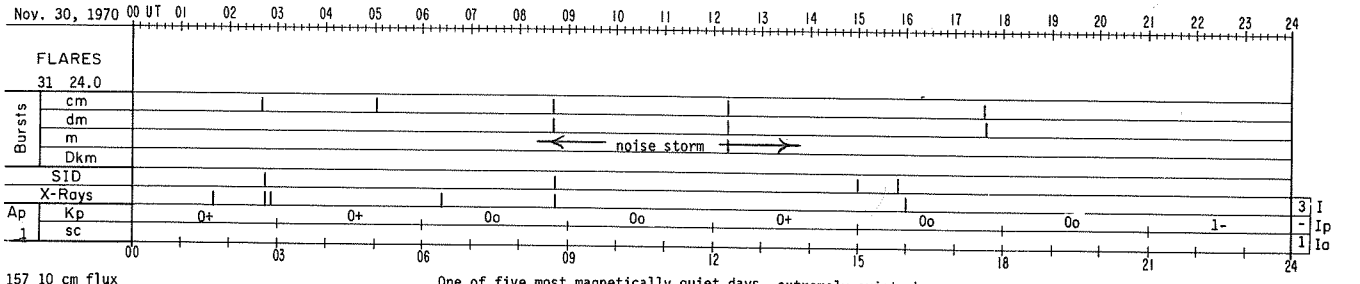
ABBREVIATED CALENDAR RECORD





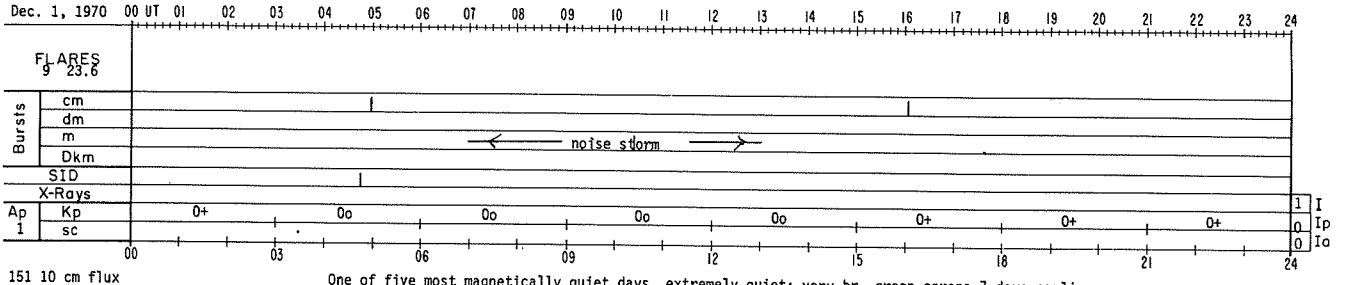
152 10 cm flux
78 Rz
CMP 11053 S12 (3) 18221 S11 (αp)5 CMP Nov. 28
(18224) S12 αp CMP Nov. 30

One of five most magnetically quiet days.



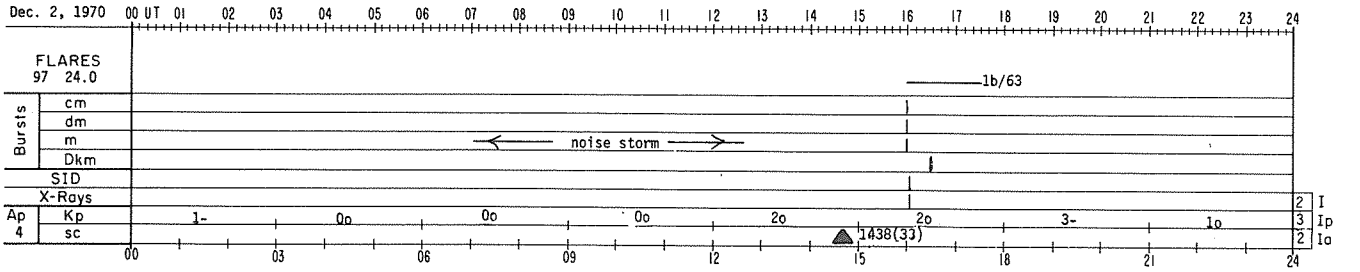
157 10 cm flux
103 Rz

One of five most magnetically quiet days, extremely quiet; br. green corona seven days later on NW and SW limb, moderately br. green corona seven days earlier on NE and SE limb.



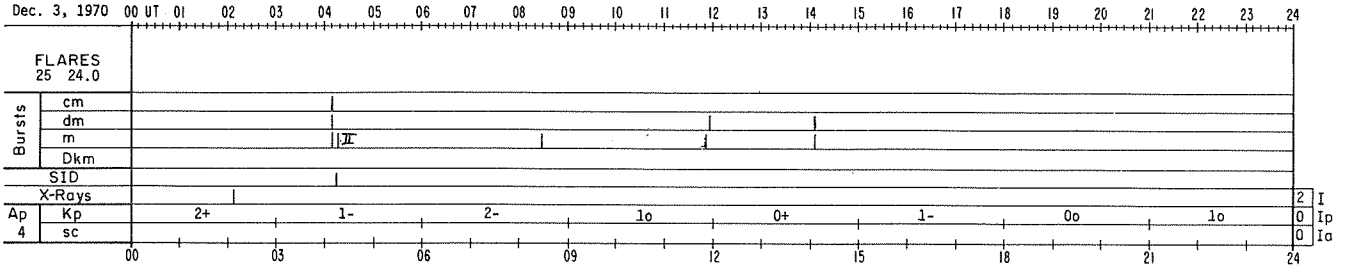
151 10 cm flux
91 Rz (Final)
CMP 11062 S26 (2)
11057 N19 (2)

One of five most magnetically quiet days, extremely quiet; very br. green corona 7 days earlier on NE and SE limb, moderately br. green corona 7 days later on NW and SW limb.



153 10 cm flux
78 Rz
CMP 11059 S05 (2)
11067 S32

Very br. green corona 7 days earlier on NE and SE limb.



152 10 cm flux
78 Rz
CMP 11060 N20 (2&1)

18225 N15 (βp)6 CMP Dec. 2
18226 N21 (βp)5

No coronal data 7 days earlier on E. limb, moderately br. green corona
7 days later on NW limb.

NOVEMBER 29, 1970 (P = 17.03, B_o = 1.13, L_o = 204.39)

UNIV. COLLEGE LONDON
LEICESTER UNIV.

X-RAY
OSO-5

Np

NO DATA

E W

Sp

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

PROSPECT HILL
AFCRL

8.6 mm

Np

NO DATA

E W

Sp

Contours in Intervals of 200° K

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

Np

NO DATA

E W

Sp

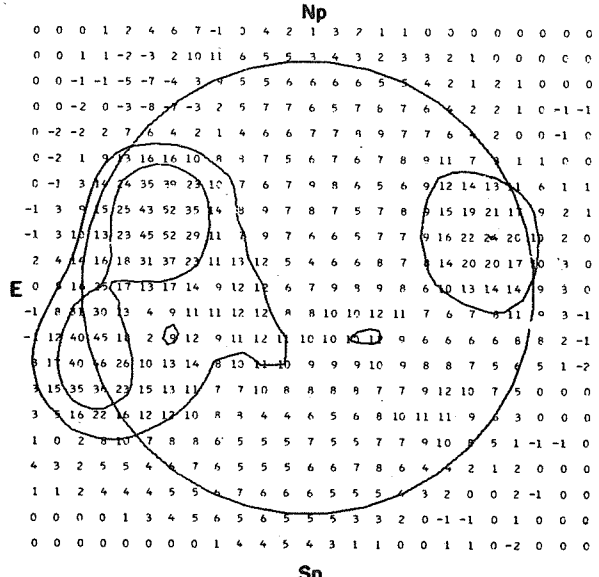
Levels
±5
±10
±20
±40
±80

80

STANFORD

9.1 cm

Np



E W

Sp

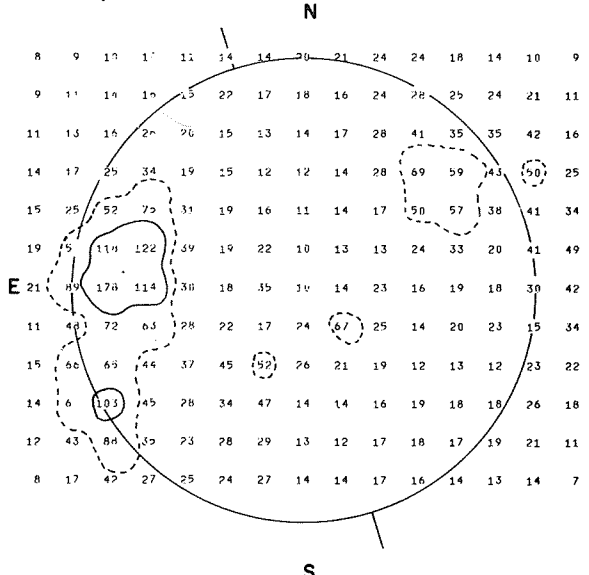
Brightness Unit 5,000° K

20-21 UT

FLEURS, AUSTRALIA

21 cm

N



E W

S

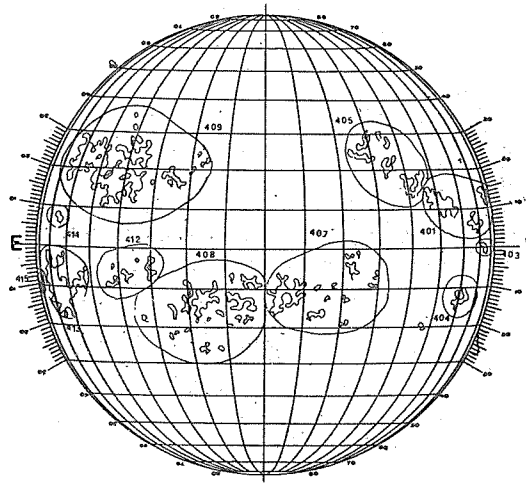
Resolution 3 Minutes of Arc
Brightness Unit 1,700° K

02-03 UT

CALCIUM REPORT

CATANIA

Np



04-08-3.2
01-31-3.5
05-23-3.1
W 08-36-5.8
12-09-3.9
09-50-5.2
13-64-4.7

E

Sp

1013 UT

NOVEMBER 30, 1970 (P = 16.66, B_o = 1.01, L_o = 191.21)

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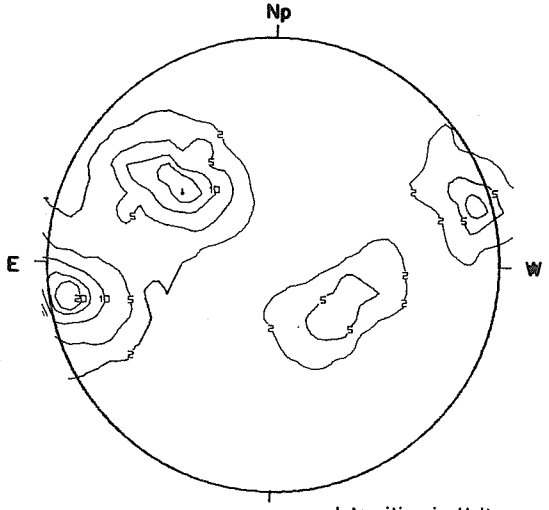
LEICESTER UNIV.

X-RAY
OSO-5

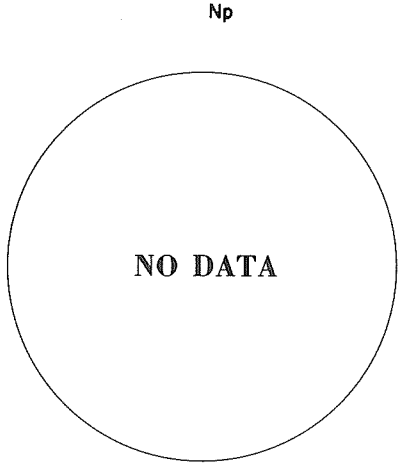


Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

81 2303-2359 UT

PROSPECT HILL
AFCRL

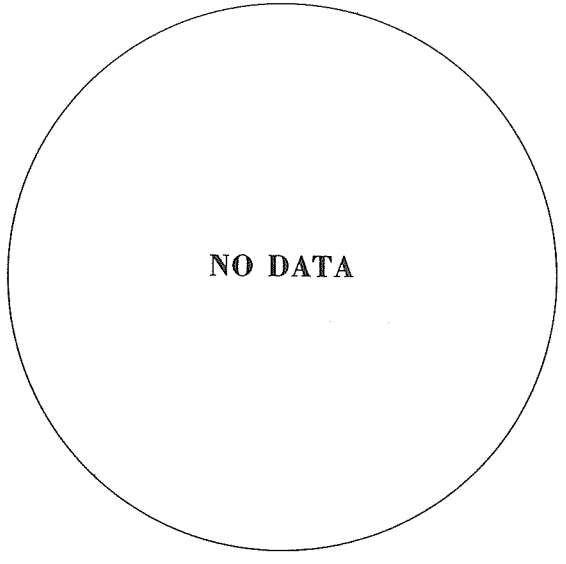
8.6 mm



Contours in Intervals of 200° K

MT. WILSON

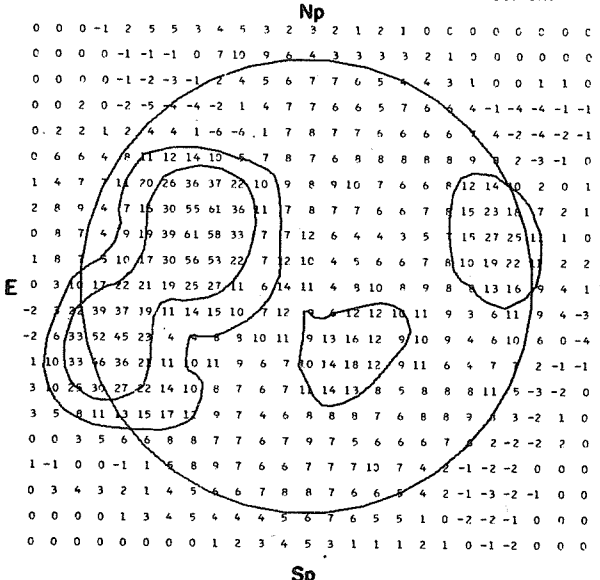
MAGNETOGRAM
Solid-Plus
Dotted-Minus



Levels
±5
±10
±20
±40
±80

STANFORD

9.1 cm

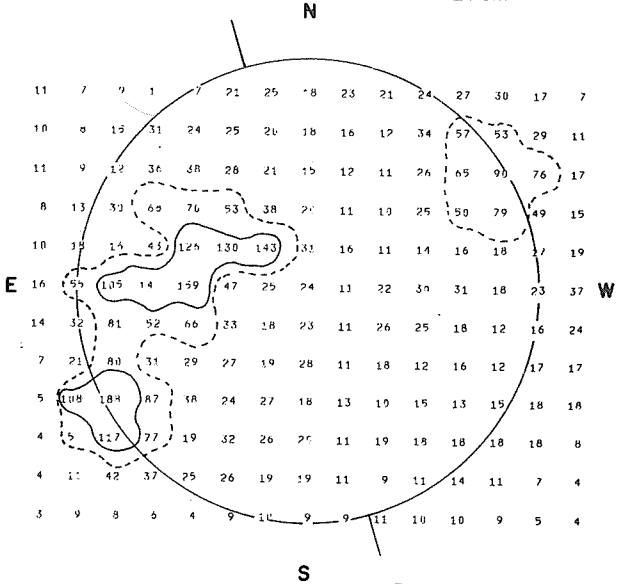


Brightness Unit 5,000° K

20-21 UT

FLEURS, AUSTRALIA

21 cm

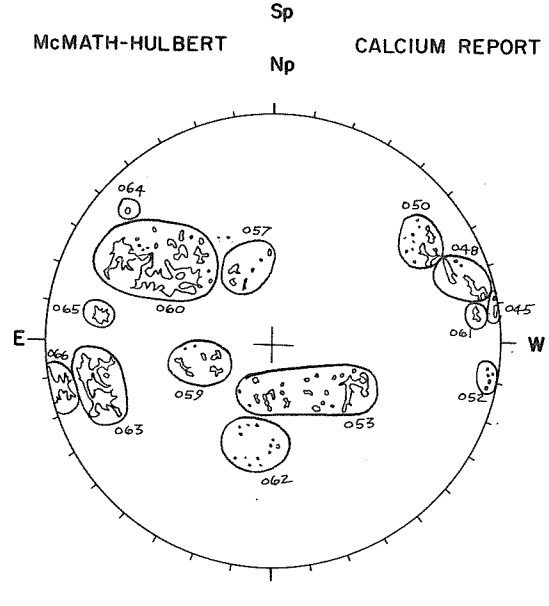


Resolution 3 Minutes of Arc
Brightness Unit 1,700° K

02-03 UT

McMATH-HULBERT

CALCIUM REPORT



FAIR	M
48-17-2.5	
50-12-2.5	
60-52-3.5	
61-06-2.5	
63-35-3.0	
65-08-3.0	
66-34-3.0	

1540 UT

DECEMBER 1, 1970 (P = 16.28, B_o = 0.88, L_o = 178.03)

MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

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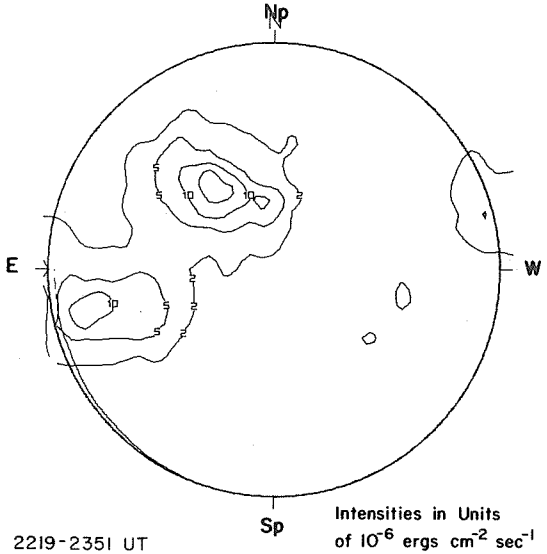
LEICESTER UNIV.

X-RAY
OSO-5

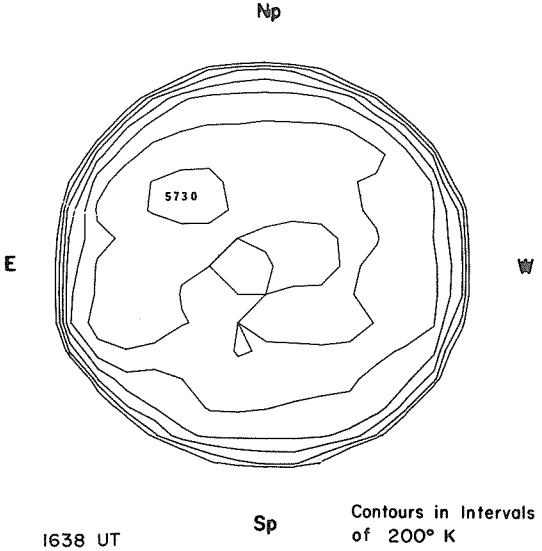


2219-2351 UT

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

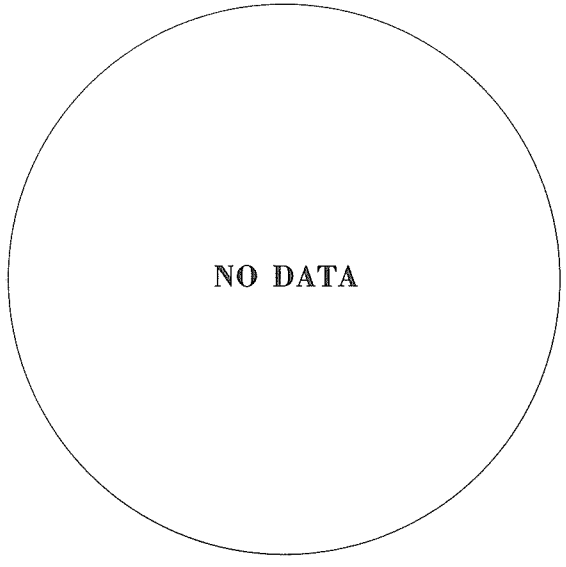
PROSPECT HILL
AFCRL

8.6 mm



1638 UT

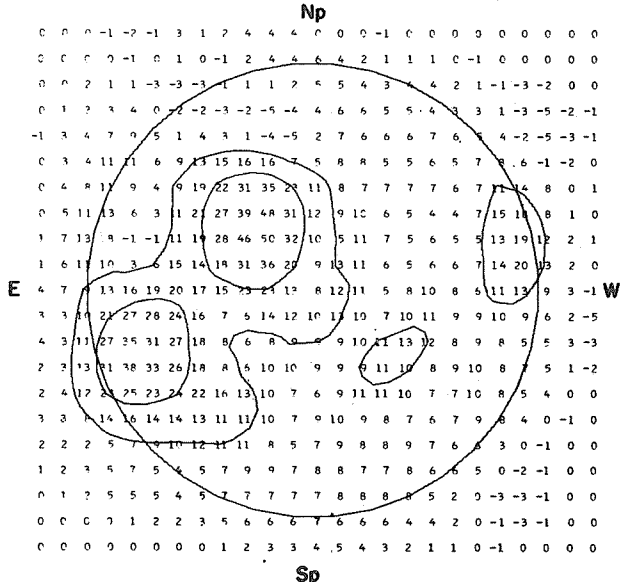
Contours in Intervals of 200° K



Levels
±5
±10
±20
±40
±80

STANFORD

9.1 cm

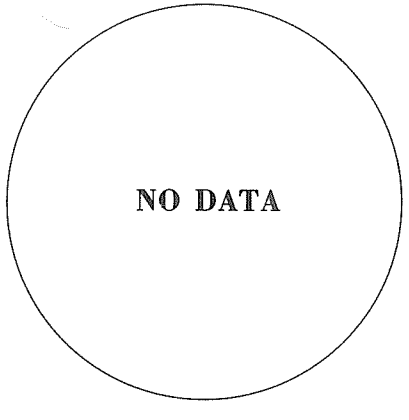


20-21 UT

Brightness Unit 5,000° K

FLEURS, AUSTRALIA

21 cm

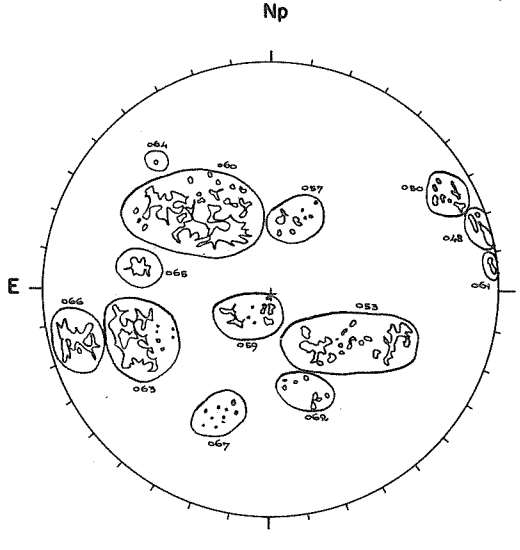


02-03 UT

Resolution 3 Minutes of Arc
Brightness Unit 1,700° K

McMATH-HULBERT

CALCIUM REPORT



1600 UT

FAIR	M
48	18 - 3.0
53	25 - 2.5
60	55 - 3.5
63	32 - 2.5
65	10 - 2.5
66	35 - 2.5

DECEMBER 2, 1970 (P = 15.89, B_o = 0.75, L_o = 164.86)

MT. WILSON

Np

MAGNETOGRAM
Solid - Plus
Dotted - Minus

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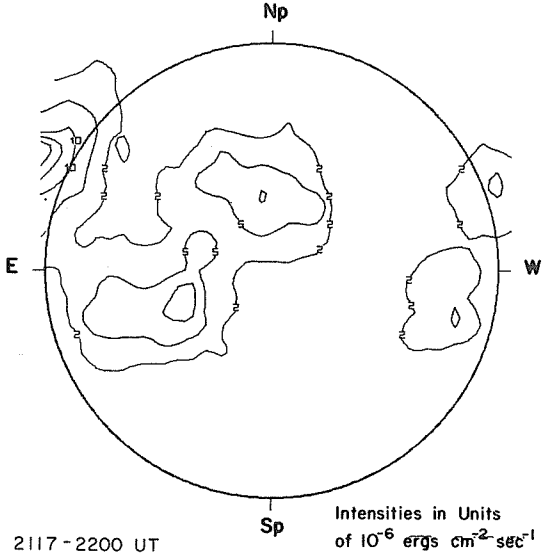
X-RAY
OSO-5

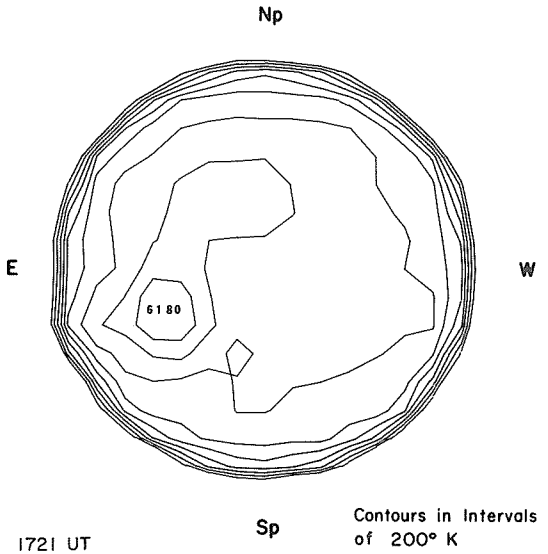


2117 - 2200 UT

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

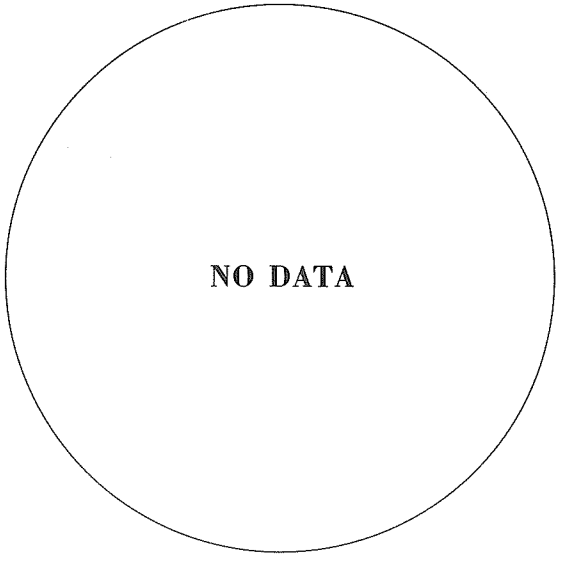
PROSPECT HILL
AFCRL

8.6 mm



1721 UT

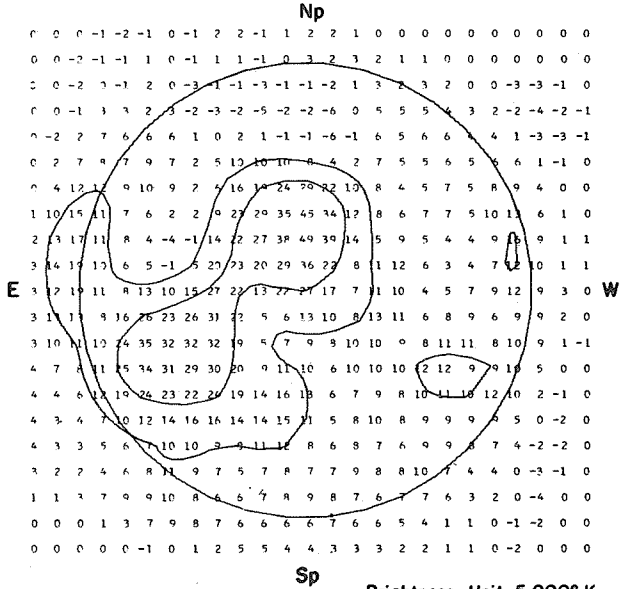
Contours in Intervals of 200° K



Levels
±5
±10
±20
±40
±80

STANFORD

9.1 cm

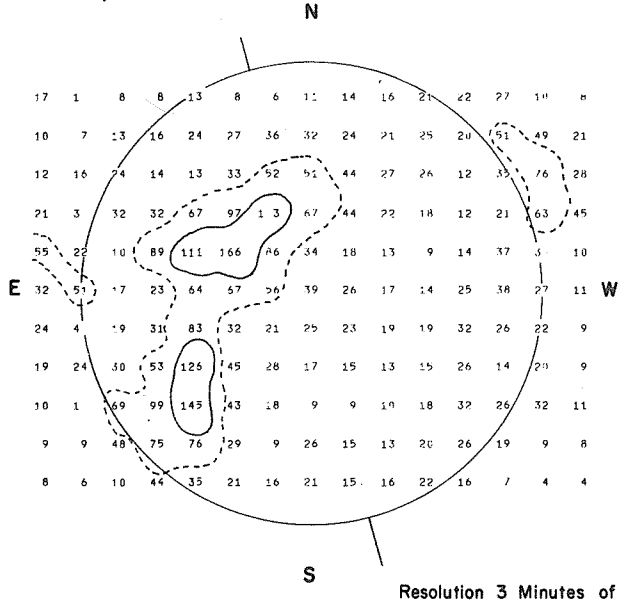


20-21 UT

Brightness Unit 5,000° K

FLEURS, AUSTRALIA

21 cm

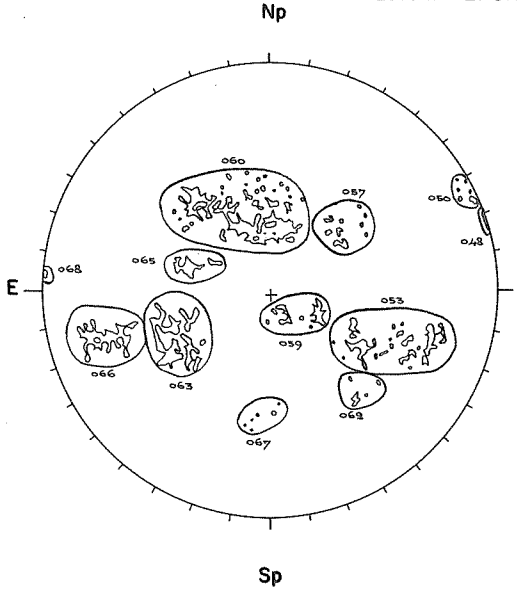


02-03 UT

Resolution 3 Minutes of Arc
Brightness Unit 1,700° K

McMATH-HULBERT

CALCIUM REPORT



1420 UT

FAIR	M
60-56-	3.0
63-31-	2.5
65-13-	3.0
66-30-	2.5

DECEMBER 3, 1970 (P = 15.50, B_o = 0.62, L_o = 151.68)

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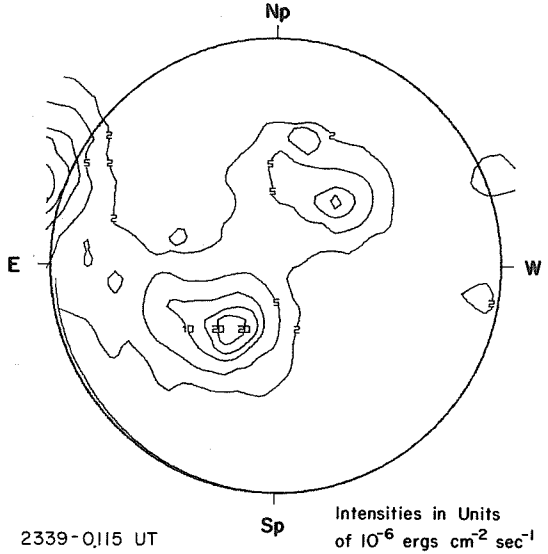
X-RAY
OSO-5

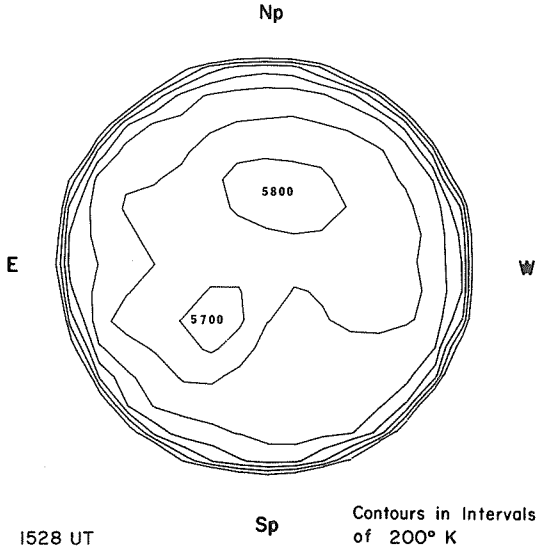


2339-0115 UT

Intensities in Units of 10^{-6} ergs cm^{-2} sec^{-1}

PROSPECT HILL
AFCRL

8.6 mm



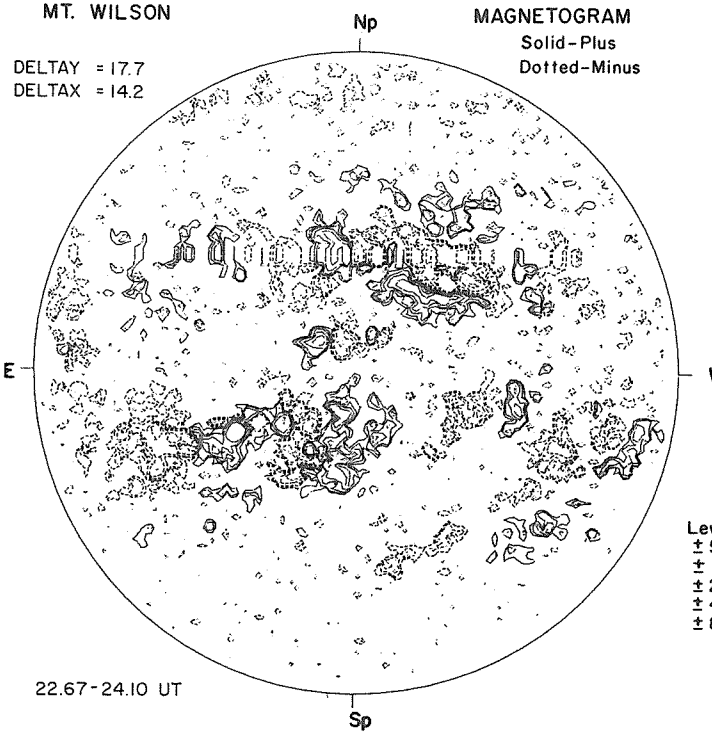
1528 UT

Contours in Intervals of 200° K

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 17.7
DELTAX = 14.2

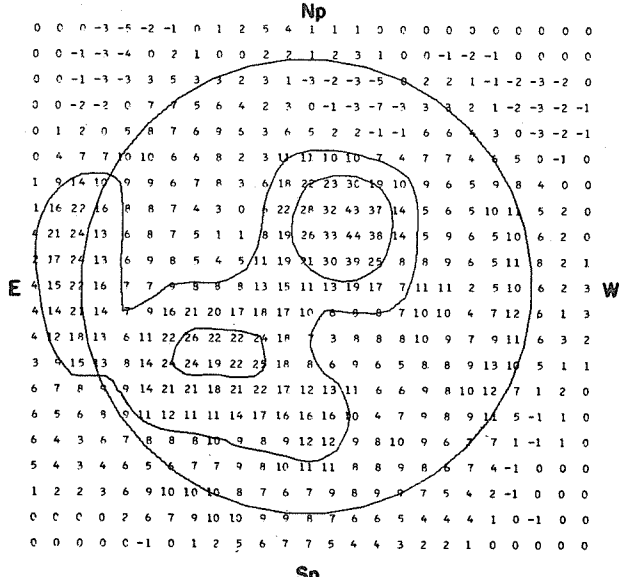


Levels
± 5
± 10
± 20
± 40
± 80

22.67-24.10 UT

STANFORD

9.1 cm

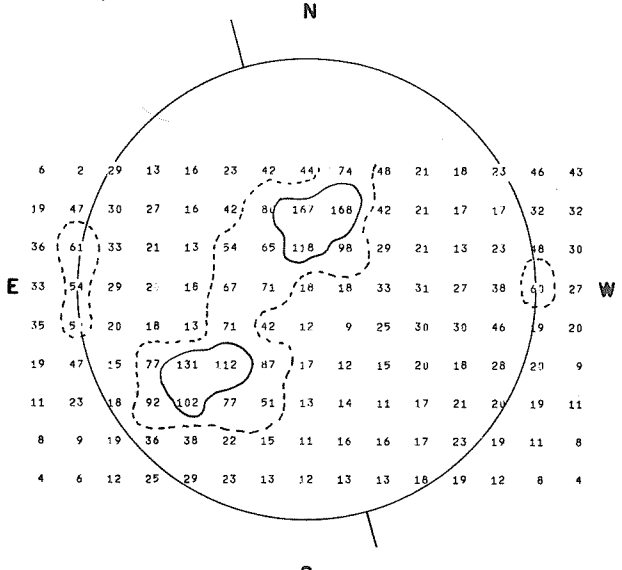


20-21 UT

Brightness Unit 5,000° K

FLEURS, AUSTRALIA

21 cm

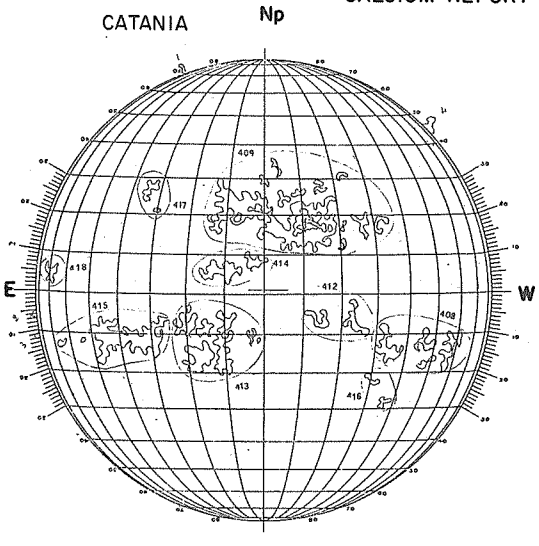


02-03 UT

Resolution 3 Minutes of Arc
Brightness Unit 1,700° K

CALCIUM REPORT

CATANIA



08-35-3.6
12-10-3.8
09-103-6.6
14-16-5.8
13-46-5.1
15-49-5.4

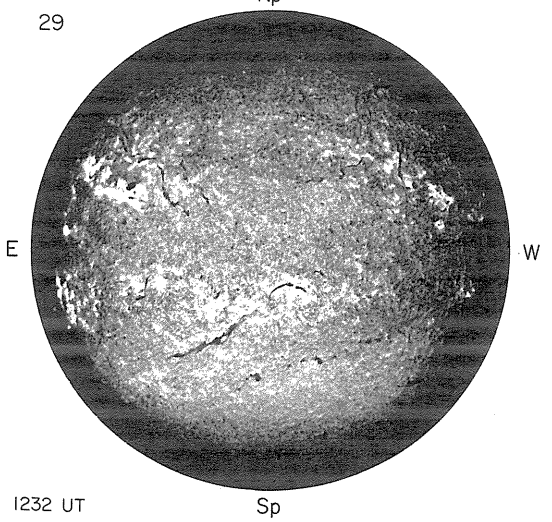
0955 UT

Hα SPECTROHELIOGRAMS

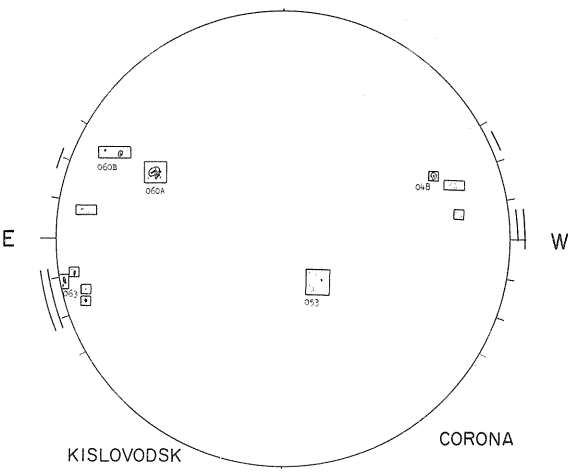
SUNSPOTS AND CORONA

November 29 - December 3, 1970

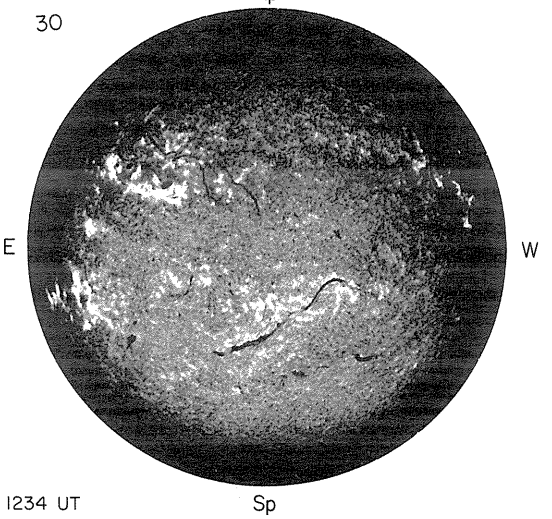
RAMEY AFB
29
Np
Hα
E
W
1232 UT
Sp



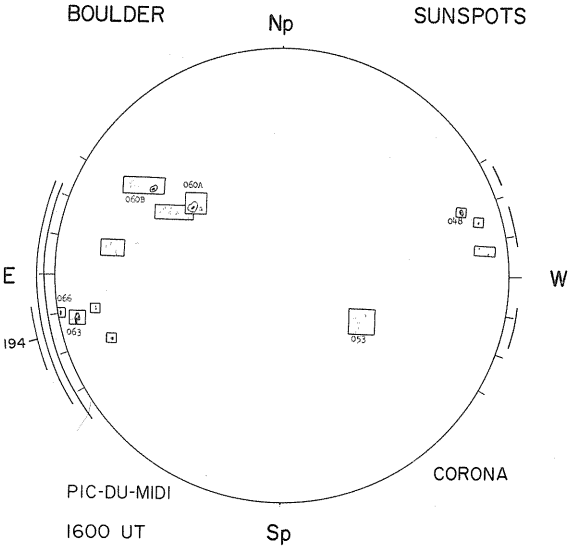
BOULDER
Np
SUNSPOTS
E
W
060B
060A
048
053
KISLOVODSK
1800 UT
CORONA
Sp



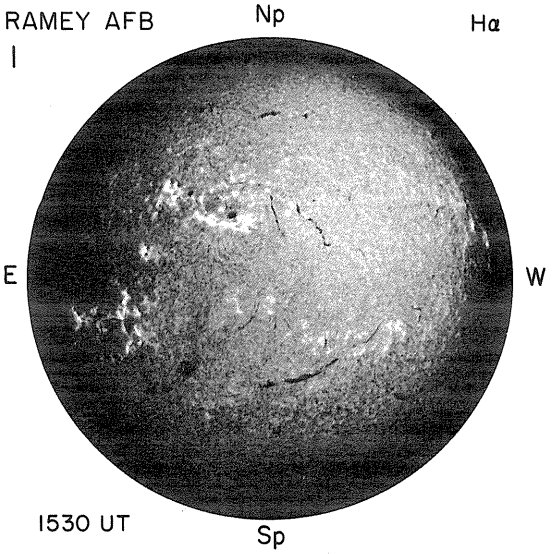
RAMEY AFB
30
Np
Hα
E
W
1234 UT
Sp



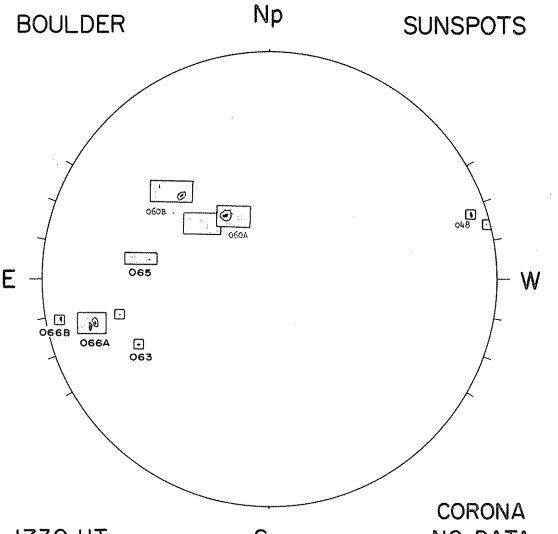
BOULDER
Np
SUNSPOTS
E
W
060B
060A
048
066
063
053
194
PIC-DU-MIDI
1600 UT
CORONA
Sp



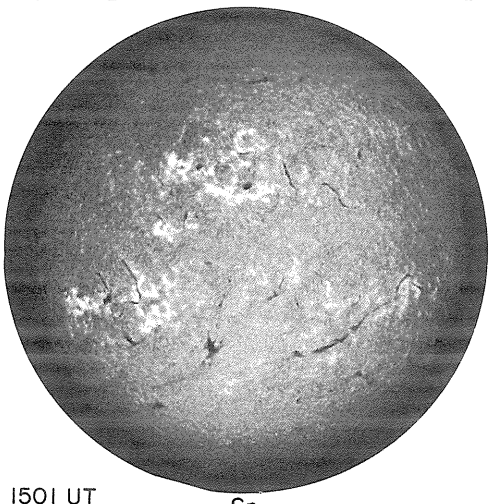
RAMEY AFB
1
Np
Hα
E
W
1530 UT
Sp



BOULDER
Np
SUNSPOTS
E
W
060B
060A
048
065
066B
066A
063
1730 UT
Sp
CORONA
NO DATA

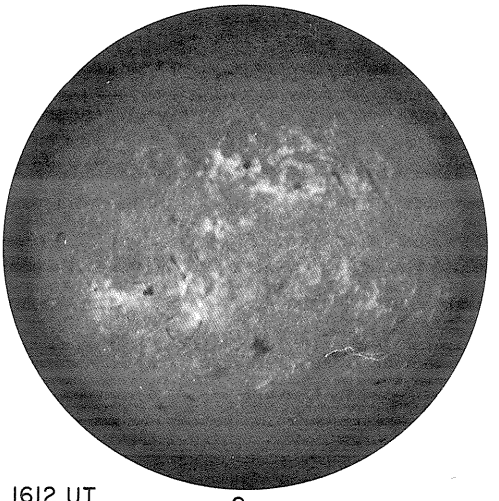


RAMEY AFB
2
Np
Hα
E
W
1501 UT
Sp



BOULDER
Np
SUNSPOTS
E
W
060B
060A
048
065
066B
066A
063
1830 UT
Sp
CORONA
NO DATA

BOULDER
3
Np
Hα
E
W
1612 UT
Sp



BOULDER
Np
SUNSPOTS
E
W
060B
060A
065
070A
066B
066A
063
1630 UT
Sp
CORONA
NO DATA

REGIONS OF SOLAR ACTIVITY
Visible on Solar Disk from November 29 - December 3, 1970

MCMATH REGION 11045 CMP DATE 24.5 RETURN OF REGION 11002* ROTATION 7

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT
70	11	18	11045	N11	E79	262	1200	3.5
70	11	19	11045	N10	E65	263	1100	2.5
70	11	20						
70	11	21	11045	N11	E38	264	1100	2.5
70	11	22						
70	11	23	11045	N10	E12	263	900	2.0
70	11	24	11045	N10	W01	263	700	2.0
70	11	25	11045	N10	W15	263	900	2.0
70	11	26	11045	N10	W28		800	2.0
70	11	27						
70	11	28						
70	11	30	11045	N09	W80	263	700	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT	CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
18214	N10	E78	261	(BP)	3	10	2	B	8	4
18214	N10	E65	263	(BP)	3	100	3	D	6	3
18214	N09	E49	266	(BP)	4	140	4	D	6	2
18214	N09	E38	263	(BP)	5	30	3	D	6	3
18214	N09	E24	264	(BP)	5				7	4
18214	N09	E11	264	(BP)	5				5	3
18214	N10	W02	264	(BP)	6	50	4	C	5	3
18214	N09	W18	267	(AP)	5	50	1	H	5	3
						40	3	H		
						10	2	A	4	2
						10	1	H	4	2

MCMATH REGION 11052 CMP DATE 25.0 RETURN OF REGION 11005 ROTATION 3

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT
70	11	21	11052	S09	E44		300	1.0
70	11	23	11052	S09	E17	258	300	1.5
70	11	24	11052	S09	E05	257	200	1.5
70	11	25	11052	S09	W10	258	200	1.0
70	11	26	11052	S09	W23		300	1.0
70	11	27						
70	11	30	11052	S09	W75	258	300	1.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT	CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
						10	2	A		

MCMATH REGION 11061 CMP DATE 25.7

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT
70	11	30	11061	N07	W65	248	600	2.5
70	12	1	11061	N07	W78	247	900	2.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT	CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
						20	2	D		

MCMATH REGION 11048 CMP DATE 26.1 RETURN OF REGION 11002* ROTATION 7

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT
70	11	19						
70	11	20						
70	11	21	11048	N18	E60	242	700	2.0
70	11	22						
70	11	23	11048	N18	E34	241	600	2.0
70	11							
70	11	24	11048	N18	E18	244	800	2.0
70	11							
70	11	25	11048	N18	E04	244	1100	2.0
70	11							
70	11	26	11048	N17	W09		1500	2.5
70	11							
70	11	27						
70	11							
70	11	28						
70	11							
70	11	29						
70	11							
70	11							
70	11	30	11048	N17	W62	245	1700	2.5
70	11							
70	12	1	11048	N17	W75	244	1800	3.0
70	12		11048					
70	12	2	11048	N17	W85	241	900	1.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT	CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
18215	N17	E89	239	AP	0					
18215	N16	E71	244	(AP)	3	110	1	H		
18215	N17	E60	241	(AP)	5	90	1	H	5	3
18215	N17	E47	241	(AP)	6				11	6
18222	N15	E29	246	(AF)	2				9	5
18215	N17	E34	241	(AP)	5					
18222	N15	E15	247	(BF)	1	0	1	A	8	4
18215	N18	E21	241	(AP)	5	150	1	H		
18222	N12	E02	247	(B)	4	40	11	D	9	5
18215	N17	E10	239	(AP)	6	180	4	H		
						180	6	C		
						20	12	C		
						150	1	H	8	4
						20	8	B		
						120	1	H	7	4
						30	7	H		
						120	1	H	8	5
						10	6	B		
						10	2	C		
						110	1	H	9	5
						10	1	H		
18215	N17	W68	237	AP	0	100	1	H	6	3
						0	1	A		
						10	1	A		

MCMATH REGION 11049 CMP DATE 26.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT
70	11	20						
70	11	21	11049	N11	E72	230	1200	2.5
70	11	22						
70	11	23	11049	N13	E45	230	1000	3.0
70	11	24	11049	N13	E31	231	900	2.5
70	11	25	11049	N13	E15	233	700	2.5
70	11	26	11049	N13	E03		500	2.5

SUNSPOT DATA 9.1 CM

MW NO.	LAT	CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
18216	N10	E88	227	(AP)	2					
18216	N11	E70	231	A	0					
									8	4

* An asterisk beside the "Return of Region" number indicates that the new region is only part of the area of the old region.

REGIONS OF SOLAR ACTIVITY

NOVEMBER 1970

MCMATH REGION 11050 CMP DATE 27.2 RETURN OF REGION 11002* ROTATION 7

				CALCIUM PLAGE DATA				SUNSPOT DATA							9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT FLUX
70	11	21	11050	N25 E75	227	800	1.0									
70	11	23	11050	N25 E48	227	900	2.0									
70	11	24	11050	N25 E34	228	800	2.0									
70	11	25	11050	N25 E20	228	1200	2.0									
70	11	26	11050	N26 E07		1300	2.5									
70	11	30	11050	N26 W45	228	1200	2.5									
70	12	1	11050	N25 W58	227	1000	2.0									
70	12	2	11050	N26 W71	227	1000	1.5								4	2

MCMATH REGION 11053 CMP DATE 29.9 RETURN OF REGION 11012 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA								9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	11	22						18221	S11 E89	199	AP	0					
70	11	23	11053	S08 E80	195	1500	2.5	18221	S10 E70	205	(AP)	3	230	1	H	7	4
70	11	24	11053	S10 E70	192	2000	2.5	18221	S10 E56	206	(AP)	5	110	2	H	8	4
70	11	25	11053	S11 E54	194	2500	2.0	18221	S11 E45	204	(AP)	5	70	4	H		
70	11							18224	S12 E64	185	AP	0				6	3
70	11	26	11053	S12 E40		2800	3.0						60	7	C		
70	11	27											20	4	H	5	3
70	11	28											20	4	D		
70	11												0	4	B	5	3
70	11	29											20	9	C		
70	11												20	1	H	19	11
70	11												10	1	H		
70	11												40	3	H		
70	11	30	11053	S12 W10	193	2400	2.0						0	8	C	5	3
70	12	1	11053	S13 W23	192	2500	2.5										
70	12	2	11053	S13 W35	191	2800	2.0						170	8	H		
70	12	4	11053	S13 W63	192	2800	2.0										
70	12	5	11053	S13 W77	192	2100	2.0										
70	12	6	11053	S13 W90	192	1500	2.0										

DECEMBER 1970

MCMATH REGION 11062 CMP DATE 1.0 RETURN OF REGION 11013* ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT FLUX
70	11	30	11062	S27 E05	178	400	1.5									
70	12	1	11062	S26 W09	178	400	1.5									
70	12	2	11062	S26 W22	178	300	2.0									
70	12	4	11062	S26 W54	183	300	2.0									

MCMATH REGION 11057 CMP DATE 1.2 RETURN OF REGION 11014 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT FLUX
70	11	25	11057	N17 E75	173	400	1.0									
70	11	26	11057	N19 E60		700	1.5									
70	11	30	11057	N19 E07	176	600	2.0									
70	12	1	11057	N19 W06	175	600	2.0									
70	12	2	11057	N19 W19	175	600	2.0									
70	12	4	11057	N17 W46	175	600	2.0									
70	12	5	11057	N16 W60	175	500	1.5									
70	12	6	11057	N15 W73	175	600	2.5	18236	N09 W76	175	(BF)	2	10	1	H	
70	12	7	11057	N12 W85	175	200	1.5									

MCMATH REGION 11059 CMP DATE 2.1 RETURN OF REGION 11021 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT FLUX
70	11	30	11059	S06 E19	164	800	2.0									
70	12	1	11059	S05 E06	163	700	2.0									
70	12	2	11059	S05 W07	163	900	2.0									
70	12	4	11059	S05 W33	162	800	2.0									
70	12	5	11059	S06 W47	162	800	2.0									
70	12	6	11059	S06 W60	162	800	2.0									
70	12	7	11059	S06 W68	158	500	1.0									

REGIONS OF SOLAR ACTIVITY

DECEMBER 1970

MCMATH REGION 11067 CMP DATE 2.8

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	12	1	11067	S33 E15		300	1.0
70	12	2	11067	S32 E03	153	300	1.0
70	12	4	11067	S33 W22	151	300	1.5
70	12	5	11067	S33 W41	156	300	1.5
70	12	6	11067	S33 W52	154	400	1.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX

MCMATH REGION 11060 CMP DATE 3.4

RETURN OF REGION 11018, 11030 ROTATION 2 & 1

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	11	25					
70	11	26	11060	N18 E80		1800	3.0
70	11	27					
70	11						
70	11						
70	12	1	11060	N19 E22	147	5500	3.5
70	12						
70	12						
70	12	2	11060	N20 E10	146	5600	3.0
70	12						
70	12	3					
70	12						
70	12						
70	12	4	11060	N20 W16	145	5500	3.0
70	12						
70	12	5	11060	N20 W33	148	5600	3.0
70	12						
70	12	6	11060	N20 W45	147	5400	3.0
70	12						
70	12	7	11060	N20 W57	147	5000	3.0
70	12						
70	12	8	11060	N20 W70	147	4700	2.5
70	12						
70	12	9	11060	N24 W80	142	2000	2.5
70	12	10	11060	N24 W90	141	500	1.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
								17	9
					210	5	H		
					250	3	H	31	17
					100	1	H		
					10	1	A		
18225	N15 E12	157	BP	0	320	18	C	21	12
					20	14	B		
18226	N21 E28	141	BP	0	190	13	C		
					180	1	H	18	10
					300	4	C		
18225	N15 W14	155	(BP)	6	310	9	C		
18226	N21 E02	139	(BP)	5	180	4	C		
					10	3	B		
18225	N15 W28	155	(BP)	6	240	7	C	15	9
18226	N21 W11	138	(BP)	5	130	6	C		
18225	N15 W36	152	(BP)	6	200	1	H	13	8
18226	N22 W22	138	(BP)	5	60	5	D		
18225	N16 W57	156	(AP)	5	200	2	H	15	8
18226	N22 W42	141	(AP)	4	60	7	C		
18225	N16 W64	152	(BP)	5	200	1	H	11	7
18226	N22 W49	137	(BP)	3	20	1	H		
18225	N16 W81	157	AP	0	200	1	H	13	7
18226	N23 W62	138	BP	0	10	1	H		
18226	N20 W80	139	AP	0				4	2

MCMATH REGION 11065 CMP DATE 4.0

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	11	30	11065	N07 E49	134	800	3.0
70	12	1	11065	N07 E36	133	1000	2.5
70	12	2	11065	N07 E19	137	1300	3.0
70	12						
70	12	3					
70	12	4	11065	N07 W09	138	1000	3.0
70	12	5	11065	N06 W22	137	800	2.5
70	12	6	11065	N06 W35	137	900	2.5
70	12	7	11065	N06 W47	137	600	2.5
70	12	8	11065	N06 W60	137	800	2.0
70	12	9	11065	N06 W75	137	700	1.5
70	12	10	11065	N05 W85	136	300	1.0

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
					10	6	B		
18227	N05 E33	136	BP	0	10	8	B		
					10	5	B		
					10	5	A		
18227	N05 E07	134	(BP)	2	20	13	B		
18227	N06 W07	134	(BP)	2	0	2	A		

MCMATH REGION 11063 CMP DATE 4.5

RETURN OF REGION 11019 ROTATION 3

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
70	11	30	11063	S12 E53	130	3500	3.0
70	11						
70	12	1	11063	S13 E38	131	3200	2.5
70	12						
70	12	2	11063	S12 E25	131	3100	2.5
70	12						
70	12	3					
70	12						
70	12						
70	12	4	11063	S13 W02	131	3200	3.5
70	12	5	11063	S14 W17	132	3200	3.0
70	12						
70	12	6	11063	S14 W30	132	3300	3.0
70	12						
70	12	7	11063	S15 W42	132	3100	3.0
70	12						
70	12	8	11063	S15 W56	133	3300	3.0
70	12	9	11063	S15 W70	132	3000	2.5
70	12	10	11063	S15 W80	131	2600	2.0
70	12	11					

SUNSPOT DATA 9.1 CM

MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
					20	3	H		
					10	3	H		
18228	S08 E34	135	AP	0					
18229	S18 E34	135	AP	0	20	3	C		
					10	3	A	11	6
					10	1	A		
18229	S18 E10	131	(BF)	2	190	16	C		
					20	17	B		
					0	3	A		
18229	S18 W03	130	(BP)	3	20	16	C	15	9
18229	S18 W14	130	(B)	3	110	11	D	15	9
18233	S08 W10	126	(A)	2					
18229	S17 W34	133	(BF)	3	80	16	D	13	7
18233	S08 W33	132		0					
18233	S09 W43	131		0				9	5
18229	S17 W42	130	(BF)	4	10	5	C		
18229	S17 W55	131	BF	0	0	2	A	10	6
18229	S18 W76	135	AP	0				10	6
								6	4
					50	1	H		

REGIONS OF SOLAR ACTIVITY

December 1970

MCMATH REGION 11064 CMP DATE 4.5

				CALCIUM PLAGE DATA				SUNSPOT DATA								9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	11	30	11064	N36 E50	133	100	2.0										
70	12	1	11064	N35 E38	131	100	1.0										

MCMATH REGION 11066 CMP DATE 6.4

				CALCIUM PLAGE DATA				SUNSPOT DATA								9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	11	30	11066	S13 E75	108	3400	3.0						280	8	C	21	12
70	11												60	1	H		
70	12	1	11066	S13 E63	106	3500	2.5	18230	S11 E59	110	BP	0	350	11	C	15	8
70	12												50	4	H		
70	12	2	11066	S12 E50	105	3000	2.5						10	1	H	13	7
70	12	3						18230	S11 E32	109	(BP)	5	30	6	C		
70	12	4	11066	S13 E23	106	3300	3.0	18230	S11 E17	110	(BP)	5	300	15	C	9	5
70	12												30	6	C		
70	12	5	11056	S14 E08	107	3300	3.0	18230	S11 E06	110	(BP)	5	200	6	D	8	4
70	12												50	4	D		
70	12	6	11066	S14 W05	107	3300	3.0	18230	S11 W12	111	(BP)	5	200	4	H	6	4
70	12												20	4	C		
70	12	7	11066	S13 W16	106	3800	3.0	18230	S11 W20	108	(BP)	5	260	12	C		
70	12												10	6	C		
70	12	8	11066	S14 W29	106	3400	3.0	18230	S10 W33	109	BP	0	180	9	H		
70	12												10	4	A		
70	12	9	11056	S14 W45	107	3200	3.0	18230	S11 W60	119	AP	0					
70	12	10	11066	S14 W57	108	3200	2.5	18230	S11 W69	117	(AP)	4					
70	12	11						18230	S10 W80	116	(AP)	3				6	4
70	12	12														6	4
70	12	13														4	2

MCMATH REGION 11072 CMP DATE 7.3

				CALCIUM PLAGE DATA				SUNSPOT DATA								9.1 CM	
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	AREA	CNT	C	INT	FLUX
70	12	5	11072	N22 E20	95	100	2.0										
70	12	6	11072	N21 E08	94	400	1.5										
70	12	7	11072	N22 W03	93	300	1.5										

Note:

No calcium spectroheliograms were obtained at the McMath-Hulbert Observatory on November 2-5, 11, 14, 15, 20, 22 and 27-29, 1970.
No Mt. Wilson Sunspot Observations were made on November 4-7 and 26-30, 1970.

Because of unusually adverse weather conditions during the month of December, no calcium spectroheliograms were obtained at the McMath-Hulbert Observatory on December 3, 11-13, 16-25 and 30, 1970.
No Mt. Wilson Observatory observations were made on December 2, 16, 17, 19-22, 24, 26 and 27, 1970.

SOLAR FLARES
Confirmed
NOVEMBER 1970

OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS					REMARKS
	DATE 1970 NOV	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT. %	
211 RAMY	28	1631	1635D		S15	E80	.987	11063	4.7	4D	-N		C						DE 1
	28	1635	1703	NO FLARE PATROL															
GRP35212	28	1713	1731	1717	S15	E80	.987	11063	4.7	18	-N								2 2 0 3
BOUL	28	1713	1731	1717	S14	E80	.987	11063	4.7	18	-N	1	V						
RAMY	28	1713	1716D		S15	E80	.987	11063	4.7	3D	-N		C						DE
	28	1737	1800	NO FLARE PATROL															
	28	2117	2155	NO FLARE PATROL															
	28	2233	2244	NO FLARE PATROL															
	28	2400	0001	NO FLARE PATROL															
213 CRON	29	0144	0156	0148	N20	E66	.921	11060	4.0	12	--N	1	C	0148	.33				1
214 CULG	29	0345	0413	0355	N23	E65	.918	11060	4.0	28	1N		C	0355	1.34				2
	29	1641	1647	NO FLARE PATROL															
	29	1848	1856	NO FLARE PATROL															
	29	2023	2120	NO FLARE PATROL															
219 RAMY	29	2050E	2053D	2051U	N15	E35	.605	11060	2.5	3D	--B		V		.72				DE 1
	29	2127	2132	NO FLARE PATROL															
220 PALE	29	2220	2234D	2222U	N16	E34	.597	11060	2.5	14D	--F		C		.63				F 2
GRP35221	30	0140	0222	0146	N17	E42	.698	11060	3.2	42	-N				1.15				2 2 2 3
CULG	30	0140	0224	0146	N16	E39	.659	11060	3.0	44	1N		C	0146	1.86	2.34			
CRON	30	0148	0220	0145U	N15	E39	.655	11060	3.0	40	-N	2	C	0145	.44	.57			
CRON	30	0218	0238	0222	N22	E52	.816	11060	4.0	20	-F	2	C	0222	.23	.38			
GRP35222	30	0242	0318	0250	N18	E38	.656	11060	3.0	36	-N				1.58				4 4 4 4
CRON	30	0238	0320U	0248	N16	E37	.635	11060	2.9	42D	-B	2	C	0248	1.22	1.54			
CULG	30	0238	0326	0254	N18	E38	.656	11060	3.0	48	1N		C	0254	2.58	3.37			
KODA	30	0244E	0303D	0247	N17	E39	.663	11060	3.0	19D	-N		V	0244	1.60	1.60	2.24		CE
VORO	30	0246	0307	0249	N19	E39	.672	11060	3.0	21	-F		C	0249	.93	1.20		86	EJ
223 CRON	30	0415	0428	0416	S10	W20	.387	11053	28.7	13	--F	2	C	0416	.11	.12			2
224 TEHR	30	0432	0455	0436	S16	E06	.310	11053	30.6	23	--N		C		.45				DE 2
GRP35225	30	0615	0648	0623	N17	E36	.627	11060	3.0	33	-N				1.33				4 4 4 6
TEHR	30	0614	0652	0622	N18	E37	.644	11060	3.0	38	-N		C		.83				F
ABST	30	0614	0630D	0615	N17	E37	.639	11060	3.0	16D	1F		P	0615	2.70	3.50			EJ
CRON	30	0616	0647	0623	N16	E36	.623	11060	3.0	31	-N	2	C	0623	1.00	1.23			
CATA	30	0630E	0645	0630	N17	E35	.615	11060	2.9	15D	-N			0630	.80	1.04		170	B
GRP35228	30	0839	0901	0844	N17	E34	.603	11060	2.9	22	--N				.30				2 2 2 6
TEHR	30	0836	0901	0844	N17	E34	.603	11060	2.9	25	-N		C		.36				DE
CRON	30	0842	0900	0844	N16	E34	.598	11060	2.9	18	-N	2	C	0844	.23	.27			
GRP35229	30	0842	0854	0843	S12	E76	.973	11066	6.1	12	-N				.45				4 4 4 6
CANR	30	0841	0856	0843	S12	E75	.968	11066	6.0	15	-N	2	C	0843	.43				
CAPE	30	0842	0850	0843	S12	E77	.976	11066	6.1	8	-N		C	0843	.86				
CRON	30	0842	0856	0843	S12	E75	.968	11066	6.0	14	-N	2	C	0843	.23				
TEHR	30	0842	0855	0843	S11	E77	.976	11066	6.1	13	-N		C		.27				DE
GRP35231	30	0956	1036	0958	N16	E34	.598	11060	3.0	40	--N				.30				3 3 2 8
CANR	30	0954	0957D	0957	N16	E35	.610	11060	3.0	3D	-N	2	V			.30			
TEHR	30	0955	1102	0957	N17	E34	.603	11060	3.0	67	-F		C		.36				DE
CATA	30	1000	1010	1000	N15	E34	.593	11060	3.0	10	-N			1000	.23	.29		191	
GRP35232	30	1133	1201	1139	N18	E33	.596	11060	3.0	28	--F				.58				2 2 2 6
TEHR	30	1129	1207	1137	N18	E33	.596	11060	3.0	38	-F		C		.64				DE
RAMY	30	1136	1155	1140	N17	E33	.590	11060	3.0	19	-F		C		.52				DE
GRP35236	30	1553	1607	1557	S13	E87	.999	11066	7.2	14	-B								2 1 0 3
RAMY	30	1553	1607D	1557U	S13	E87	.999	11066	7.2	14D	-B		C						DE
BOUL	30	1559	1607	1601	S12	E74	.964	11066	6.2	8	-F	1	V						

SOLAR FLARES
Confirmed
November - December 1970

OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS					REMARKS
	DATE	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT. %	
	1970 NOV																		
GRP35237	30	1622	1633	1626	N17	E28	.528	11060	2.8	11	--F				.46				4 4 3 4
RAMY	30	1620	1630	1625	N17	E28	.528	11060	2.8	10	-F		C		.46				DE
CANR	30	1621	1637		N16	E30	.547	11060	2.9	16	-N	2	V		.50				
BOUL	30	1624	1634	1626	N17	E27	.515	11060	2.7	10	-N	1	V						
MCMA	30	1625E	1630D	1626	N17	E28	.528	11060	2.8	5D	-F		C	1626	.41	.50			E
GRP35238	30	1741	1813	1743	N24	E22	.520	11060	2.4	32	--F				.71				3 3 3 3
RAMY	30	1738	1815	1744	N23	E22	.510	11060	2.4	37	-F		C		.52				DE
PALE	30	1740	1811	1741	N25	E21	.521	11060	2.3	31	-N		C		.99				F
MCMA	30	1745	1756D		N25	E23	.540	11060	2.5	11D	-F		C	1753	.62	.70			E
GRP35239	30	2011	2024	2014	N17	E28	.528	11060	2.9	13	--F				.39				3 3 2 3
RAMY	30	2010	2022	2012	N17	E29	.540	11060	3.0	12	-F		C		.41				DE
BOUL	30	2012	2029	2013	N17	E28	.528	11060	2.9	17	-F	1	V						
PALE	30	2018E	2022	2018E	N18	E27	.522	11060	2.9	4D	-F		C		.36				F
GRP35240	30	2132	2137	2134	N16	E28	.521	11060	3.0	5	--F				.34				2 2 2 2
RAMY	30	2132	2137D	2134U	N17	E29	.540	11060	3.1	5D	-F		C		.46				DE
PALE	30	2132	2137	2133	N15	E27	.501	11060	2.9	5	-F		V		.21				DE
	DEC																		
242 CRON	01	0250	0302	0251	S11	E61	.881	11066	5.7	12	--N	2	C	0250	.22	.45			3
GRP35243	01	0427	0503	0433	S09	E49	.764	11063	4.9	36	-N				1.13				3 3 3 5
TEHR	01	0423	0515	0433	S08	E49	.762	11063	4.9	52	-N		C		.68				F
CRON	01	0429	0450	0433	S10	E49	.766	11063	4.9	21	-N	1	C	0433	.54	.83			
CULG	01	0429	0446D	0433	S08	E48	.751	11063	4.8	17D	1N		P	0433	2.17	3.15			
GRP35244	01	0437	0457	0441	N23	E39	.692	11060	4.1	20	--N				.47				2 2 2 5
CRON	01	0437	0452	0440	N22	E38	.676	11060	4.0	15	-N	1	C	0440	.65	.88			
TEHR	01	0437	0502	0442	N24	E39	.698	11060	4.1	25	-N		C		.28				FDE
245 CRON	01	0454	0512	0456	S13	E63	.899	11066	5.9	18	--N	1	C	0456	.32				4
GRP35246	01	0543	0609	0545	N09	W77	.974	11061	25.5	26	-N				.45				2 1 1 5
TEHR	01	0543	0609	0545	N09	W77	.974	11061	25.5	26	-N		C		.45				F
ABST	01	0547E	0602	0548	N10	W82	.990	11061	25.1	15D	1F		P	0548	2.34			47	EN
GRP35250	01	0826	0836	0828	N23	E37	.671	11060	4.1	10	--N				.58				4 4 4 8
ABST	01	0810	0834D	0828	N24	E36	.667	11060	4.0	24D	-N		P	0828	1.26	1.70		63	DJK
CATA	01	0825	0830	0825	N21	E36	.649	11060	4.1	5	-B			0825	.14	.19		202	
ARCE	01	0825	0835D	0828	N22	E37	.666	11060	4.1	10D	-F		C	0828	.63	.80			
TEHR	01	0827	0845	0832	N23	E37	.671	11060	4.1	18	-N		C		.28				DE
252 HTPR	01	1428	1500	1442	S08	E43	.692	11063	4.8	32	--F		C	1442	.62	.90			E 3
	01	1533	1535	NO FLARE PATROL															
	01	1718	1719	NO FLARE PATROL															
	01	1720	1730	NO FLARE PATROL															
254 BOUL	01	1739	1754	1740	S13	E75	.969	11066	7.4	15	-N	1	V						2
256 PALE	01	2028E	2059	2037U	N13	E86	.997	11068	8.3	31D	--F		C		.19				F 3
257 PALE	01	2118E	2144	2127U	S14	W18	.395	11053	30.5	26D	--F		C		.36				F 2
GRP35258	01	2132	2141	2132	N01	E79	.982	11068	7.8	9	--F				.19				2 2 1 2
PALE	01	2131	2141	2131	N04	E78	.978	11068	7.7	10	-F		C		.19				
BOUL	01	2133	2141	2133	S02	E80	.985	11068	7.9	8	-F	2	V						
	01	2253	2302	NO FLARE PATROL															
259 PALE	01	2342E	2352D	2342U	N25	E27	.581	11060	4.0	10D	--F		C		.19				2
	01	2359	0000	NO FLARE PATROL															
260 TEHR	02	0520E	0535	0523U	S18	E33	.609	11063	4.7	15D	--F		C		.28				DE 4
GRP35262	02	0538	0608	0542	S13	W25	.475	11053	30.4	30	-N				2.02				3 3 3 5
TEHR	02	0537	0615	0541	S14	W24	.469	11053	30.4	38	-N		C		1.19				FS
CRON	02	0539	0600	0543	S13	W22	.435	11053	30.6	21	-N	1	C	0543	.43	.48			
CULG	02	0544E	0555D		S12	W30	.536	11053	30.0	11D	1N		P	0544	4.43	5.19			
GRP35263	02	0541	0603	0544	S09	W44	.706	11053	28.9	22	--F				.39				2 2 2 5
CRON	02	0540	0555	0542U	S07	W43	.690	11053	29.0	15	-F	1	C	0542	.22	.30			
TEHR	02	0541	0610	0545	S10	W45	.720	11053	28.9	29	-N		C		.55				FS
GRP35264	02	0747	0802	0754	S08	E33	.560	11063	4.8	15	--F				.34				2 2 2 5
TEHR	02	0744	0803	0754U	S07	E33	.557	11063	4.8	19	-F		C		.45				DE
CRON	02	0750	0800	0753	S08	E32	.546	11063	4.7	10	-N	1	C	0753	.22	.26			

SOLAR FLARES
Confirmed
DECEMBER 1970

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS					REMARKS
	DATE 1970 DEC	START	END	MAX. PHASE	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hα	MAX. INT. %	
GRP35265	02	1419	1439	1423	S17	E28	.542	11063	4.7	20	-N		C		1.11				4 4 4 5
MCMA	02	1419	1430	1422	S16	E27	.522	11063	4.6	11	-F		C	1422	.83	.90			EK
HTPR	02	1419	1430	1423	S17	E27	.530	11063	4.6	11	-N		C	1423	1.44	1.70			
CANR	02	1420	1445	1423	S18	E26	.526	11063	4.5	25	-N	2	C	1423	.65	.76			
CAPS	02	1422E	1451D		S18	E30	.573	11063	4.8	29D	-N	2	S	1425	1.50	2.00		164	
35265	02	1433	1446	1436	S17	E27	.530	11063	4.6	13	*-N				.41				4 4 4 6
HUAN	02	1431	1437D	1436	S18	E28	.550	11063	4.7	6D	-N	2	P	1436	.43	.52			E
HTPR	02	1433	1444	1436	S17	E27	.530	11063	4.6	11	-F		C	1436	.41	.50			
MCMA	02	1434	1443	1436	S18	E27	.538	11063	4.6	9	-N		C	1436	.26	.26			D
RAMY	02	1434E	1452D	1434E	S13	E24	.462	11063	4.4	18D	-N		V		.52				DE
GRP35268	02	1447	1529	1459	N26	E02	.427	11060	2.8	42	--F				.68				4 4 4 5
HTPR	02	1445	1529	1459	N27	E02	.443	11060	2.8	44	-F		C	1459	.93	1.00			
HUAN	02	1446	1457D	1453	N27	E03	.444	11060	2.8	11D	-N	2	P	1453	.21	.23			E
CANR	02	1449	1529	1502	N26	E02	.427	11060	2.8	40	-N	3	C	1502	.75	.84			
RAMY	02	1452E	1517D	1501U	N24	E02	.396	11060	2.8	25D	-F		C		.83				F
GRP35269	02	1559	1730	1611	S09	E28	.493	11063	4.8	91	1B				3.52				3 3 3 3
MCMA	02	1558	1730D	1608	S09	E28	.493	11063	4.8	92D	1B		C	1608	2.32	2.70			FLU
CANR	02	1559	1718D	1615U	S10	E29	.512	11063	4.8	79D	1B	2	C	1615	4.73	5.50			
CANR	02	1559	1718D	1603	S10	E29	.512	11063	4.8	79D	-B	2	C	1603	1.51	1.80			
RAMY	02	1601E	1647D	1611U	S09	E28	.493	11063	4.8	46D	1N		C		3.51				U
271 PALE	02	1920	1941	1926	N23	E08	.399	11060	3.4	21	--F		C		.19				3
272 PALE	02	2137	2200	2148	S09	W52	.796	11053	29.0	23	-N		C		.81				F 2
273 PALE	02	2146	2201	2147	N21	E09	.375	11060	3.6	15	--F		C		.19				F 2
274 CRON	03	0000E	0008	0001	N19	E09	.348	11060	3.7	8D	--N	2	C	0001	.43	.46			3
GRP35275	03	0203	0227	0208	S14	E42	.696	11066	6.2	24	-N				.77				3 3 3 5
PALE	03	0202	0223	0208	S18	E41	.700	11066	6.2	21	-N		C		.72				F
CRON	03	0204	0231	0207	S13	E42	.692	11066	6.2	27	-N	2	C	0207	.86	1.19			
MITK	03	0212E	0213D		S12	E42	.689	11066	6.2	1D	-N		P	0213	.72	1.00			D
GRP35277	03	0228	0243	0233	S10	E50	.776	11066	6.9	15	--N				.52				2 2 2 5
CRON	03	0228	0244	0232	S10	E50	.776	11066	6.9	16	-N	2	C	0231	.32	.51			
MITK	03	0232E	0242	0233	S10	E50	.776	11066	6.9	10D	-N		C	0233	.72	1.10			D
GRP35278	03	0326	0344	0332	S09	E48	.752	11066	6.7	18	-N				1.11				3 3 3 5
CULG	03	0322	0347	0331	S10	E47	.743	11066	6.7	25	1N		C	0331	2.17	3.15			R
CRON	03	0329	0341	0332	S11	E49	.767	11066	6.8	12	-N	2	C	0330	.32	.51			
MITK	03	0331E	0334D		S07	E49	.760	11066	6.8	3D	-N		P	0334	.83	11.30			E
GRP35279	03	0432	0449	0434	N16	W07	.290	11060	2.7	17	--N				.48				3 3 3 5
TEHR	03	0431	0449	0435U	N16	W07	.290	11060	2.7	18	-N		C		.36				DE
CRON	03	0432	0447	0433	N15	W07	.274	11060	2.7	15	-N	2	C	0433	.32	.32			
MANI	03	0435E	0450		N18	W08	.326	11060	2.6	15D	-N	2		0436	.77	.82			
GRP35280	03	0731	0803	0740	S16	E16	.390	11063	4.5	32	--F				.98				4 3 3 5
TEHR	03	0730	0804	0741	S16	E16	.390	11063	4.5	34	-F		C		.36				DE
CRON	03	0731	0801	0733	S16	E16	.390	11063	4.5	30	-F	2	C	0733	.32	.35			
MONT	03	0735E	0803	0746	S15	E15	.368	11063	4.4	28D	-N		C	0746	2.27				
MANI	03	0750E	0807		S16	E17	.401	11063	4.6	17D	-N	2		0755	.72	.78			
GRP35283	03	1049	1121	1057	S17	E16	.401	11063	4.7	32	--N				.79				4 4 4 6
HTPR	03	1047	1130	1058	S17	E15	.391	11063	4.6	43	-F		C	1058	.52	.60			
TEHR	03	1048	1127	1054	S17	E17	.412	11063	4.7	39	-N		C		.45				DE
MONT	03	1050	1111	1056	S16	E15	.379	11063	4.6	21	-N		C	1056	1.55				
CANR	03	1051	1115	1059	S17	E16	.401	11063	4.7	24	-N	2	C	1059	.65	.70			
GRP35286	03	1555	1607	1558	S09	E15	.305	11063	4.8	12	--F				.32				2 2 1 2
CANR	03	1552	1606	1555	S08	E15	.297	11063	4.8	14	-N	1	C	1555	.32	.32			
BOUL	03	1558	1608	1600	S09	E14	.292	11063	4.7	10	-F	1	V						
288 BOUL	03	1923	1935	1925	S07	E27	.470	11066	5.8	12	--F	2	V						2
GRP35289	03	2012	2143	2022	S07	E37	.611	11066	6.6	91	--N				.47				3 2 2 3
PALE	03	2012	2044	2022	S09	E39	.643	11066	6.8	32	-N		C		.63				FH
BOUL	03	2018	2143	2126U	S10	E39	.646	11066	6.8	85	-F	1	C	2126	.21	.28			
RAMY	03	2019E	2029D	2021U	S05	E35	.579	11066	6.5	10D	-N		V		.31				DE
GRP35290	03	2106	2202	2112	S16	E08	.316	11063	4.5	56	-N				1.40				3 1 1 3
BOUL	03	2106	2202	2112U	S16	E08	.316	11063	4.5	56	-N	1	C	2112	1.40	1.44			
PALE	03	2115	2204	2129	S14	E08	.287	11063	4.5	49	1N		C		2.26				FDE
CRON	03	2139E	2204		S12	E08	.258	11063	4.5	25D	1F		V		2.60				
292 MANI	03	2328	2356	2338	S19	W03	.340	11063	3.8	28	-N	2		2338	.93	.95			4

SOLAR FLARES
Confirmed
DECEMBER 1970

Note:
A line of explanation has been added before each flare event having more than one maxima. The total number of stations reporting some part of the event is given. The number of stations observing at the time of the principal maximum but not reporting the event is given in the second statement. Care should be exercised in utilizing the numbers in the remarks column. The first number is the number of stations reporting the individual maximum, and not the total number of stations reporting some part of the flare event. The last number is the number of stations reporting at the time of the individual maximum and not necessarily the total number of stations observing during the flare event. GRP numbers may appear several times in order to indicate secondary maxima. An asterisk beside an importance indicates a secondary maximum. The word "GRP" has also been omitted to aid in pointing to this condition.
When it is impossible to determine the time of Maximum Phase from the individual reports the time of Area Measurements is used. This time appears in parentheses. For Flares reported by only one station the last 3 digits of the group number appear to the left of the station code.

"Remarks":

A = Eruptive prominence, base at >90°.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No spots visible in the neighborhood.
H = Flare with high velocity dark surge.
I = Very extensive active region.
J = Plage with flare shows marked intensity variations.
K = Several intensity maxima.
L = Filaments show effects of sudden activation.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H or K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line.
S = Brightening follows disappearance of filament (same position).
T = Region active all day.
U = Close and somewhat parallel bright filaments (|| or Y shape).
V = Occurrence of an explosive phase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα emission.
Y = Onset of a system of loop-type prominences.
Z = Major sunspot umbra covered by flare.

In the importance column "--" signifies the subflare has been confirmed by the NOAA grouping program but is not included in the I.A.U. Quarterly Bulletin on Solar Activity nor are these subflares included in the Flare Index below.

DAILY FLARE INDICES

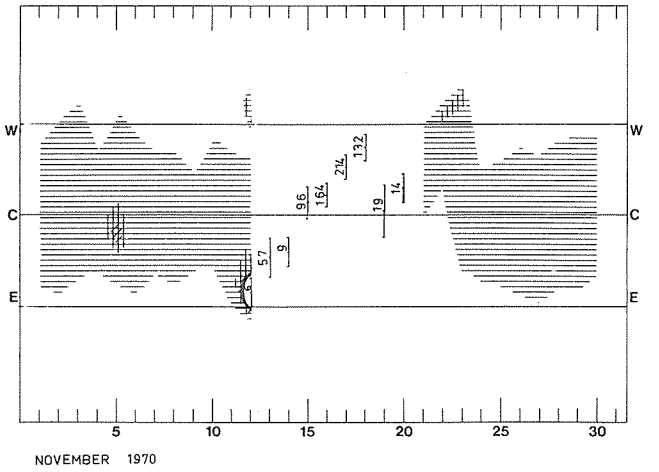
Date	Flare Index	HR OBS
701129	9.67	22.7
701130	31.40	24.0
701201	8.65	23.6
701202	96.89	24.0
701203	24.54	24.0

When no Flare Index is given, it is 0 for that day.

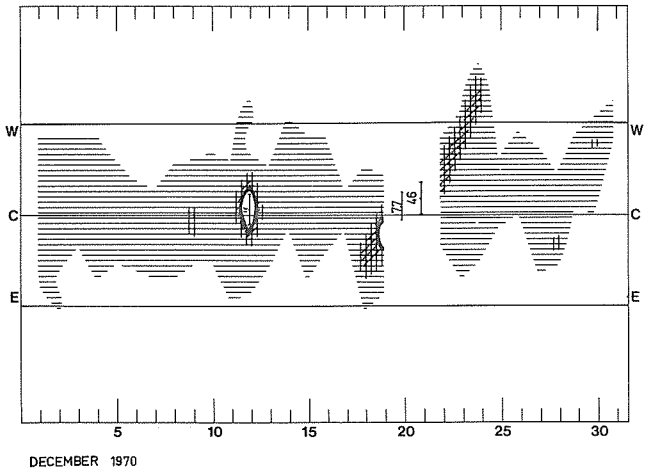
LOCATION OF EMISSIVE REGIONS.

From strip scans taken daily at Nançay.

169 Mc/s



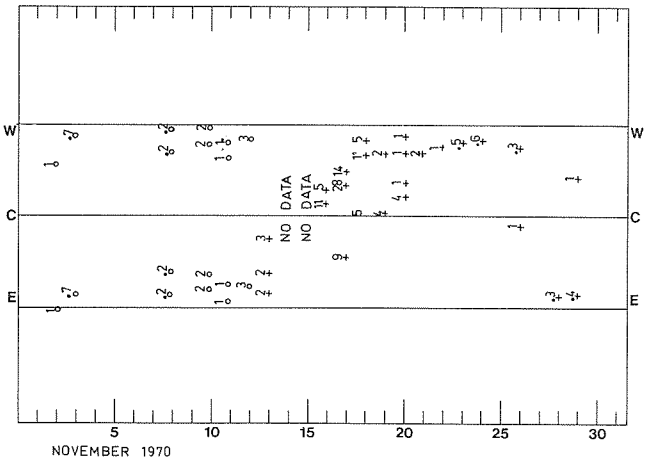
NOVEMBER 1970



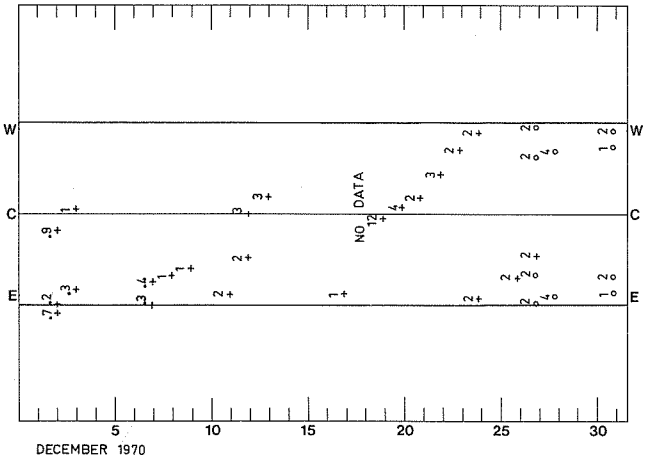
DECEMBER 1970

The half-power beamwidth is 3.8 minutes of arc. Daily distributions of intensity are plotted on the same chart giving diagrams of evolution. Equal intensity levels have been drawn for intensities that are proportional to 0.6, 1, 1.5 and 2. The first level corresponds to the sun without any radio storm center. In each noisy radio region the smoothed intensity around noon is given in 10^{-22} $Wm^{-2}(c/s)^{-1}$.

408 Mc/s.



NOVEMBER 1970



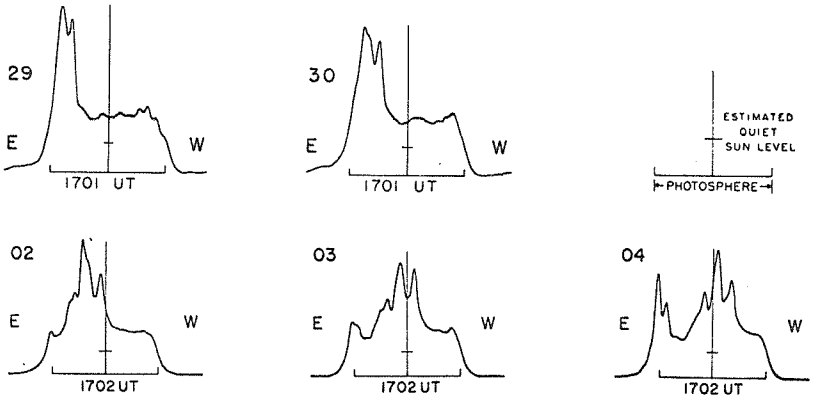
DECEMBER 1970

The half-power beamwidth of the main lobes is 1.7 minutes of arc, the main lobes are about 25' apart. Position and intensity of centers are indicated. The intensity is given in 10^{-22} $Wm^{-2}(c/s)^{-1}$. In cases of ambiguity about the position being East or West the two possible positions are indicated by a circle.

EAST - WEST SOLAR SCANS
November 29 - December 4, 1970

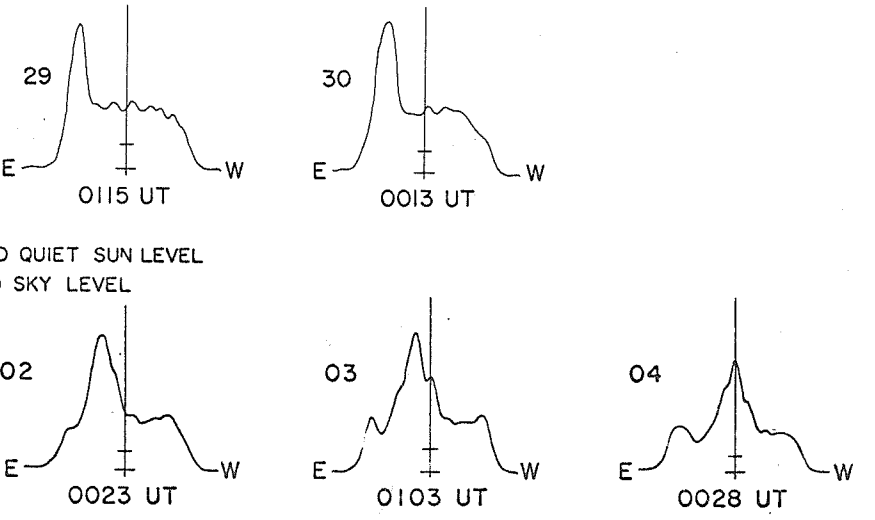
ALGONQUIN RADIO OBSERVATORY
CANADA

10.7 cm.
Fan - Beam with 1.5 minutes of arc
E - W Resolution



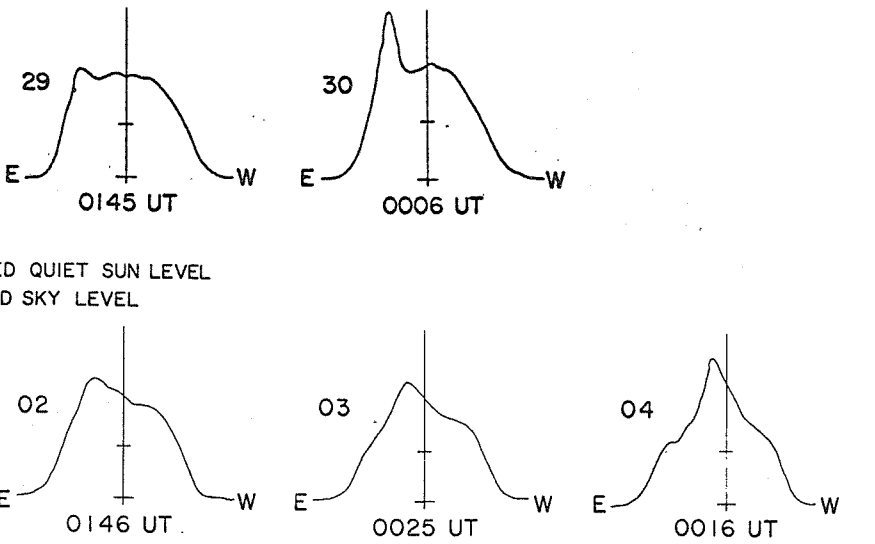
Fleurs, Australia

21 cm
Fan - Beam with 2 minutes of arc
E - W Resolution



Fleurs, Australia

43 cm
Fan - Beam with 4 minutes of arc
E - W Resolution



SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

NOVEMBER 1970

NOV. 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
29	930	BORD	5	1328	1329	2	28.0	2.0		
	2695	PENT	21	2040	2055	50	5.6	2.8		
	2695	PENT	2	2045	2149	6	3.6	2.2		
	408	SANM	3	2107.6	2107.9	.5	71.0	23.5		
	18	BOUL	41	2123	2129	11			2	
30	9400	TYKW	5	0245	0300	40	6.0	3.0		
	3750	TYKW	5	0245	0249	40	6.0	3.0		
	2000	TYKW	5	0245	0248	10	4.0	2.0		
	9400	TYKW	5	0507	0508.1	2	4.0	1.0		
	3750	TYKW	5	0507.5	0508.2	3	4.0	1.0		
	260	ONDR	41	0820	1110.5	330	45.0			
	10500	BERN	45	0841.8	0842.2	4	18.0			
	10500	BERN		0841.8	0842.3		21.0			
	10500	BERN		0841.8	0842.7		11.0			
	10500	BERN		0841.8	0842.9		12.0			
	9100	GORK	45	0841.8	0842.4	4	31.0	8.0		
	9100	GORK		0841.8	0843		17.0			
	2695	CANR	45	0842	0842.5	5			1	
	1490	BERL	22	0842	0844.2	8 U	5.8	3.1		
	1420	CRON	41	0842.5	0843	6.5			1	
30	1420	CRON	41	0842.5	0845	6.5			1	
	930	BORD	45	0842	0842.9	1	166.0	2.0		
	8800	SGMR	4	1217.8	1219.8	3.1	15.1	3.0		
	4995	SGMR	3	1217.1	1218.7	3	10.1	2.0		
	2695	SGMR	3	1217.7	1218.8	2.3	8.1	2.0		
	1415	SGMR	1	1217.3	1218.6	3.5	7.0	1.5		
	606	SGMR	4	1217.5	1218.6	3	8.9	2.0		
	245	SGMR	6	1218.9	1219.3	.9	14.2	2.0		
	408	SANM	45	1431.3	1432	1.4	31.5	8.0		
	408	SANM	45	1553.2	1555.4	3.9	235.0	9.5		
	18	BOUL	42	1629	1643	15			3	
	18	BOUL	6	1728	1734	8			3	
	2700	PENN	20	1737.4	1803.9	44.9	5.3	1.7		
	960	PENN	1	1739.6	1740.2	1.8	1.9	0.6		
	2800	OTTA	1	1803.8	1803.9	1	3.2	1.0		
	960	PENN	8	1804	1804	.2	29.2			
	408	SANM	45	1837.5	1837.9	1.2	15.5	5.5		
	2695	BOUL	3	1842.5	1843	4.5			1	
	2695	BOUL	3	1857	1857.5	4			1	
	408	SANM	45	1918.8	1919.4	1.2	27.5	7.0		
1	200	HIRA	45	0334.5	0334.5	2	100.0	10.0		
	9400	TYKW	5	0500	0500.8	2	11.0	6.0		
	8800	MANI	3	0500.2	0500.8	5.7	13.3	4.4		
	4995	MANI	3	0500.2	0500.5	7.9	8.1	2.7		
	3750	TYKW	5	0500	0500.8	1.5	3.0	1.0		
	9400	TYKW	29	0502		20	4.0	2.0		
	204	KIEV	42	0700 E		360 D	21.0	9.0		
	9500	BERL	3	1005.7	1006.5	1.6	15.0	3.0		
	408	SANM	45	1023.3	1024.6	1.7	87.0	12.0		
	237	TRST	41	1023.7	1025	1.5	170.0			
	260	ONDR	45	1024	1025	2	90.0			
	204	KIEV	6	1024.5	1024.7	.9	83.0			
	221	ABST	1	1025	1025.3	1	67.0			
	206	IZMI	6	1025	1025.2	.5	127.0	40.0		
	260	ONDR	45	1254	1254.5	1.5	70.0			
	7000	SAOP	32	1340	1343.2	-5	-14.9			
	2800	OTTA	21	1556	1611	170	12.2	5.0		
	2800	OTTA	1	1603	1605	6	8.4	4.2		
	408	SANM	3	2041.2	2041.4	.4	15.0	4.5		
	208	VORO	41	2300	2300.5	9	234.0			
2	204	KIEV	42	0700 E		335	29.0	8.0		
	600	UCCL	20	1023.5	1026.2	8.5	5.0	2.0		
	600	UCCL	1	1059	1059.3	.5	5.0	3.0		
	930	BORD	5	1539	1540	2	10.0	4.0		
	1415	SGMR	23	1555	1605.5	20.3	17.4	8.7		
	960	PENN	45	1555.6	1611	18.6	16.5	3.8		
	606	SGMR	22	1555.4	1605.8	20.9	6.0	3.0		
	2695	SGMR	23	1556.5	1605.4	34.5	18.4	9.2		
	1420	CANR	41	1556	1558.5	17			1	
	4995	SGMR	20	1558.1	1612.4	40.3	17.2	8.6		
	2695	SGMR	1	1558	1558.3	.7	3.5	1.6		
	1415	SGMR	3	1558	1558.3	.7	11.2	4.2		
	10700	PENN	20	1559.7	1611.1	60.8	19.6	10.0		
	245	SGMR	6	1559.1	1603.1	16.4	23.1	8.0		
	9400	HUAN	20	1600	1617.4	65.9	19.6	9.0		
	15400	SGMR	20	1601	1614.8	29.3	21.1	10.5		
	8800	SGMR	20	1601.6	1615.3	28	14.8	7.4		
	18	BOUL	6	1629	1632	4			1	
	18	MCMA	41	1734	1736	5			2	
	18	MCMA	6	1800	1801	2			1	
	18	MCMA	41	1833	1834	2			1	
	408	SANM	3	1850.8	1851	.4	118.0	39.0		

↕ indicates large bursts or bursts at times of ≥1F flares.

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1970

DEC 1970	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
3	500	HIRA	27	0210	0233	110	30.0	10.0		
	8800	MANI	2	0414.9	0415.8	4.1	5.3	2.7		
	4995	MANI	4	0414.9	0416.1	7.4	24.4	5.4		
	2695	MANI	4	0414.9	0416.7	7.4	84.0	22.5		
	1415	MANI	4	0414.9	0416.7	7.4	57.0	17.4		
	606	MANI	4	0414.9	0416.7	7.4	14.6	7.3		
	200	HIRA	45	0414	0416	4	1800.0D	170.0D		
	9400	TYKW	5	0415	0416	10	5.0	2.0		
	3750	TYKW	45	0415	0416	5	51.0	16.0		
	2000	TYKW	5	0415	0416.8	6	100.0	30.0		
	1000	TYKW	5	0415	0416.9	5	37.0	18.0		
	500	HIRA	45	0415	0418.2	5	15.0	10.0		
	3750	TYKW	29	0420		10	3.0	1.0		
	2000	TYKW	29	0421		10	3.0	1.0		
	1000	TYKW	29	0421		10	7.0	4.0		
	200	HIRA	45	0526	0526	1.5	50.0	10.0		
	237	TRST	41	0827.7	0827.8	.5	190.0			
	234	POTS	45	0827.8	0827.8	.1	175.0	60.0		
	204	KIEV	6	0827.8	0827.9	.3	40.0			
	260	ONDR	5	0936	0936	1	100.0			
	600	UCCL	1	0938.5		.5	8.0	5.0		
	260	ONDR	45	1100	1100	1.5	120.0D			
	600	UCCL	20	1123.5		37	8.0U	4.0U		
	260	ONDR	45	1132	1132.5	1.5	45.0			
	260	ONDR	45	1150		6.5	120.0D			
	237	TRST	42	1150.1	1154.5	6.2	11000.0			
	234	POTS	41	1151.6	1154.6	4.1	5000.0	65.0		
	408	SANM	45	1154.4	1154.6	1.3	52.0	8.0		
	600	UCCL	1	1237		.3	5.0	3.0		
	600	UCCL	1	1258.2	1258.6	.8	8.0	5.0		
	260	ONDR	45	1308	1308	1	110.0			
	237	TRST	42	1404.9	1405.3	3.3	1400.0			
	408	SANM	3	1407.7	1408	.6	15.0	4.5		
	930	BORD	45	1408	1408.1	1	10.0	2.0		
	234	POTS	45	1408	1408.1	.1	200.0	40.0		
	18	BOUL	41	1442	1447	13			2	
	408	SANM	3	1508.7	1508.9	.6	36.5	5.0		
	2695	BOUL	41	1643.5	1644.5	5				
	2695	BOUL	40	1712.5	1713.5	5				
	2695	BOUL	8	1834	1834.5	1			1	

Observatories:

ABST = Abastumani
BERL = Berlin-Adlershof
BERN = Berne
BORD = Bordeaux
BOUL = Boulder
CANR = Canary Islands
CRIM = Simferopol
CRON = Carnarvon
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
IZMI = Moscow IZMIRAN
KIEL = Kiel
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
ONDR = Ondrejov
OTTA = Ottawa ARO
PENN = Penn. State Univ.
PENT = Penticton
POTS = Potsdam
SANM = San Miguel
SLOU = Slough
SGMR = Sagamore Hill
TRST = Trieste
TYKW = Toyokawa
UCCL = Uccle
VORO = Voroshilov

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

Radio bursts observed at Boulder, Canary Islands and Carnarvon (1420, 2695 and 4995 MHz) are scaled on a relative intensity scale of 1-3 where, within a factor of three or less, 1 = <100 fu (10^{-22}Wm^{-2}Hz^{-1}), 2 = 100-1000 fu and 3 = >1000 fu.

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS
November 29 - December 3, 1970

NOV. 1970	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT.	START UT	END UT	INT.	START UT	END UT	INT.	
29	0000	0730	CULG				0441		1				IIIB,W
			CULG				0445		1				IIIB
	1116	2100	SGMR										
	1401	2333	HARV				1522	1600	1				I
			HARV				1600	1659	1				IN
	1643	2231	BOUL				1927.3	1927.6	1				III
	2022	2400	CULG	2030.5		1							IIIB,W
			CULG				2117		1				IIIB,W
			CULG				2121.5	2123.5	1				IIIG,V
			BOUL				2122.3	2123.6	2	2123.3	2123.6	2	III
			CULG				2258.5	2300	1				IIIG,V
			CULG				2312.5	2315	1				IIIG,W
			CULG				2353		1				IIIB,W
30	0000	0729	CULG				0152	0154.5	1				IIIG
			CULG				0329.5	0330.5	1				IIIG
	1130	2100	SGMR										
	1401	2334	HARV	1553	1557	2							IIIGG
	1623	2233	BOUL										
	2024	2400	CULG				2127	2127.5	1				IIIG
			CULG	2341	2341.5	1	2341	2341.5	1				IIIG
01	0000	0729	CULG				0334.5	0336.5	2				IIIG,U
	0702	1509	WEIS				1024.6	1025.2	1				IIIG
	1133	2106	SGMR										
	1649	2234	BOUL										
	1400	2334	HARV				1812	2330	1				I
	2022	2400	CULG				2022	2400	1				I
02	0000	0729	CULG				0000	0020	1				I
			CULG				0705	0706	1				IIIG,W
			CULG				0711.5		1				IIIB
			CULG				0724	0725	1				IIIG
	0735	0930	WEIS										
	1325	1505	WEIS										
	1401	2335	HARV				1602	1614	1				I
	1553	2400	BOUL				1604.9	1616.2	2	1604.9	1616.2	2	IIIGG
			HARV	1608	1613	1							IIIGG
	1125	2105	SGMR							1837.8	1839		IIIB
			BOUL				1838.2	1838.9	2	1838.2	1838.9	2	III
			BOUL				1941.9	1942	1				III
			BOUL				2021.5	2021.7	1	2021.5	2021.7	1	III
	2021	2400	CULG				2021.5	2022	1				IIIG,W
			BOUL				2029.4	2029.7	1	2029.4	2029.7	1	III
			CULG				2029.5		1				IIIB
			HARV				2147	2332	1				IN
			CULG				2253		1				IIIB,W
			CULG				2255.5		1				IIIB
			CULG				2323.5		1				IIIB
03	0000	0730	CULG				0104		1				IIIB,W,U
			CULG	0111.5	0112	1							IIIG,W
			CULG				0137	0138	1				IIIG,V
			CULG				0140.5	0141	1				IIIG,W
			CULG				0143.5	0145	1				IIIG,W
			CULG				0146.5	0147	1				IIIG
			CULG				0201	0202	1				UNCLF
			CULG				0203	0212.5	1				IIIGG
			CULG				0203.5	0204	2				IIIG,V
			CULG				0205	0205.5	2				UNCLF
			CULG				0214.5	0217.5	1				IIIG,W
			CULG				0221.5	0225	1				IIIG
			CULG				0227	0229	1				UNCLF
			CULG	0331	0332.5	1							IIIG
			CULG				0339.5		1				IIIB
			CULG	0416	0416.5	2	0413.5	0424	2	0415.5	0416.5	1	IIIG,V,U
			CULG				0420.5	0453	1				II
			CULG				0438	0439	1				UNCLF
	1120	2102	SGMR										
	0733	1505	WEIS				1154.4	1155.7	2				IIIG
	1400	2335	HARV	1405	1408	1	1405	1408	3				IIIGG
			HARV	2102	2134	1	2036	2134	1				IN
	2022	2400	CULG				2105.5	2108.5	1				IIIG,U
	1634	2300	BOUL				2107.7	2108.5	2	2107.7	2108.5	2	III
			HARV	2134	2300	1	2134	2300	1				I
			HARV				2300	2332	1				IN
	2022	2400	CULG				2306.5		1				IIIB,W
			CULG				2321		1				IIIB,W
			CULG				2324		1				IIIB,W
			CULG				2334		1				IIIB,W
			CULG				2342	2342.5	1				IIIG,W
			CULG				2350	2400	1				IIIN,W
			CULG				2350	2400	1				I

The symbols used in connection with the spectral type in describing the important bursts are as follows:

- B = Single burst
- G = Small group (< 10) of bursts
- GG = Large group (> 10) of bursts
- C = Underlying continuum (particularly with type I)
- S = Storm in the sense of intermittent but apparently connected activity
- M = Intermittent activity in this period
- U = U-shaped burst of Type III
- RS = Reverse slope burst
- DP = Drifting pairs
- DC = Drifting Chains
- H = Herringbone
- W = Weak
- CONT = Continuum
- UNCLF = Unclassified activity

SOLAR X-RAY FLARES (2-12 A°)
SATELLITES EXPLORER 33 and EXPLORER 35

November 29 - December 3, 1970

University of Iowa

Date 1970	Onset UT	Maximum UT	Peak-Ratio to Quiet Sun	Remarks and Values of Maximum Flux F (2-12 A°) in erg $(cm^2\ sec)^{-1}$
29 November	2045	2058	4	
30	0245	0253	6	
	0841	0844	6	Rapid rise, rapid decline
2 December	1556	1610	11	

SOLAR X-RAYS BY SATELLITE

EXPLORER 37
November 29 - December 3, 1970
OUTSTANDING EVENTS

Naval Research Laboratory

DAY 1970	START TIME	0.5-3A FLUX XE-5	PEAK TIME	1-8A FLUX XE-4	PEAK TIME	8-20A FLUX XE-3	PEAK TIME	END TIME	COMMENTS
Nov. 29	2051	19.00	2057	75.00	2058	40.00	2106	2108	
30	0143E	10.00D	0143E	49.00	0144	27.00	0145	0148	
30	0251E	49.00D	0251E	170.00D	0251E	53.00D	0257E	0304	
30	0624	2.20	0630	40.00	0627	24.00	0631	0631	
30	1557E	12.00D	1558E	65.00D	1557E	40.00D	1559E	1603	
Dec. 2	1601	49.00	1608	210.00	1611	80.00	1618	1628D	
3	0208	5.60	0211	43.00	0216	29.00	0217	0218D	

SOLAR X-RAYS MEASURED BY SATELLITE

SOLRAD 9 - EXPLORER 37

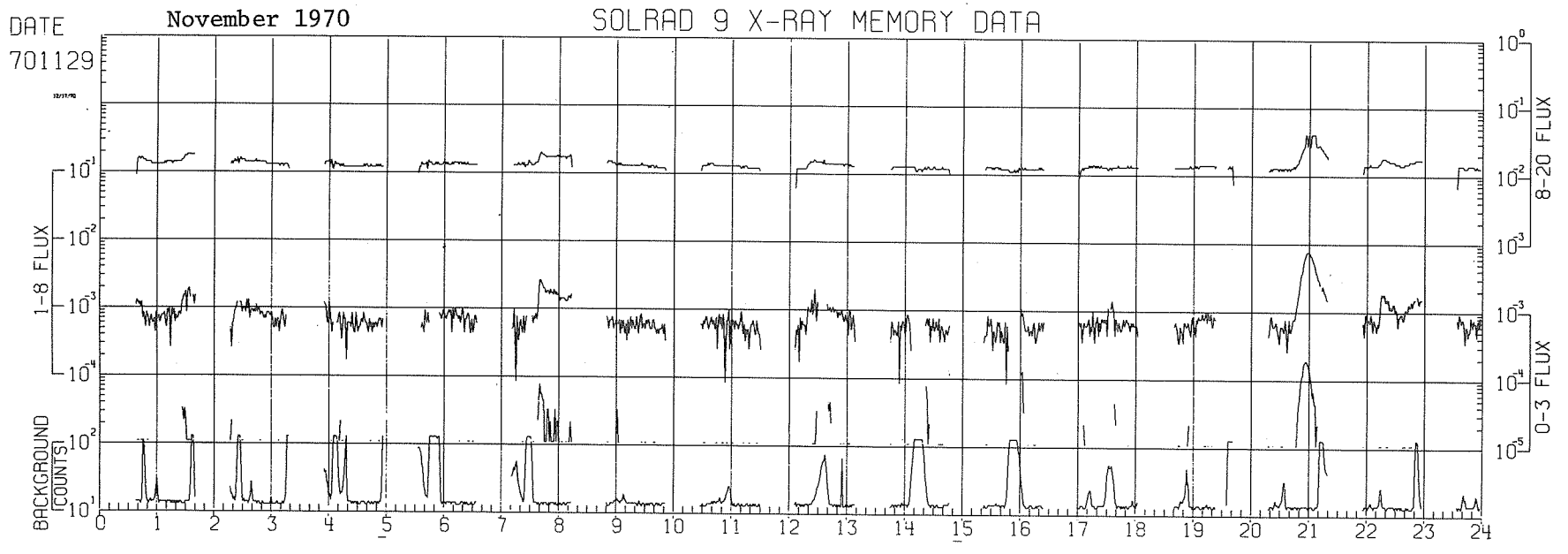
November 29 - December 3, 1970

NAVAL RESEARCH LABORATORY 1-8A HOURLY AVERAGES (10^{-3}ergs/cm^2/sec)

DATE 1970	HOUR 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Nov. 29	0.82	0.98	0.88	0.70	0.61	0.69	0.73	1.22	1.09	0.57	0.61	0.55	0.87	0.58	0.57	0.48	0.60	0.67	0.57	0.75	1.78	3.20	1.12	0.66
30	0.62	1.43	5.41	1.48	0.59	1.45	1.69	0.81	1.93	0.92	0.95	0.68	0.68	1.01	0.91	2.65	1.58	0.98	1.46	0.78	0.90	0.76	0.68	0.72
Dec. 01	0.67	0.67	0.55	0.58	0.61	1.10	0.69	0.94	0.63	0.58	0.93	0.47	0.44	0.38	0.34	0.43	0.38	0.47	0.42	0.48	0.49	0.62	0.53	0.56
02	0.49	0.54	0.42	0.46	0.45	0.87	0.51	0.43	0.47	0.40	0.40	0.45	0.37	0.39	1.09	0.51	1.20	1.31	0.56	0.59	0.98	0.98	1.25	1.91
03	2.18	1.83	2.79	1.96	1.78	1.48	1.23	1.14	1.01	0.79	0.80	0.87	0.65	0.84	0.84	0.65	0.65	0.63	0.68	0.71	0.66	1.86	1.53	1.54

NAVAL RESEARCH LABORATORY 8-20A HOURLY AVERAGES (10^{-2}ergs/cm^2/sec)

DATE 1970	HOUR 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Nov. 29	1.40	1.45	1.40	1.30	1.24	1.31	1.34	1.49	1.58	1.28	1.31	1.20	1.37	1.25	1.22	1.18	1.22	1.30	1.30	1.35	1.67	2.58	1.56	1.33
30	1.25	1.64	2.98	1.91	1.33	1.66	1.76	1.45	1.79	1.61	1.54	1.34	1.34	1.51	1.50	2.24	1.92	1.55	1.76	1.49	1.57	1.46	1.31	1.32
Dec. 01	1.28	1.24	1.23	1.27	1.25	1.53	1.25	1.39	1.24	1.20	1.28	1.04	0.95	0.93	0.96	0.94	0.92	0.90	0.97	1.05	1.09	1.17	1.14	1.10
02	1.02	1.08	1.00	0.95	0.96	1.29	1.04	1.01	0.99	0.98	0.96	0.97	0.97	0.93	1.24	1.12	5.78	1.64	1.13	1.11	1.31	1.30	1.39	1.63
03	1.87	1.76	2.26	2.01	2.06	1.79	1.65	1.62	1.48	1.36	1.36	1.44	1.29	1.29	1.24	1.19	1.29	1.30	1.21	1.30	1.21	1.97	1.83	1.90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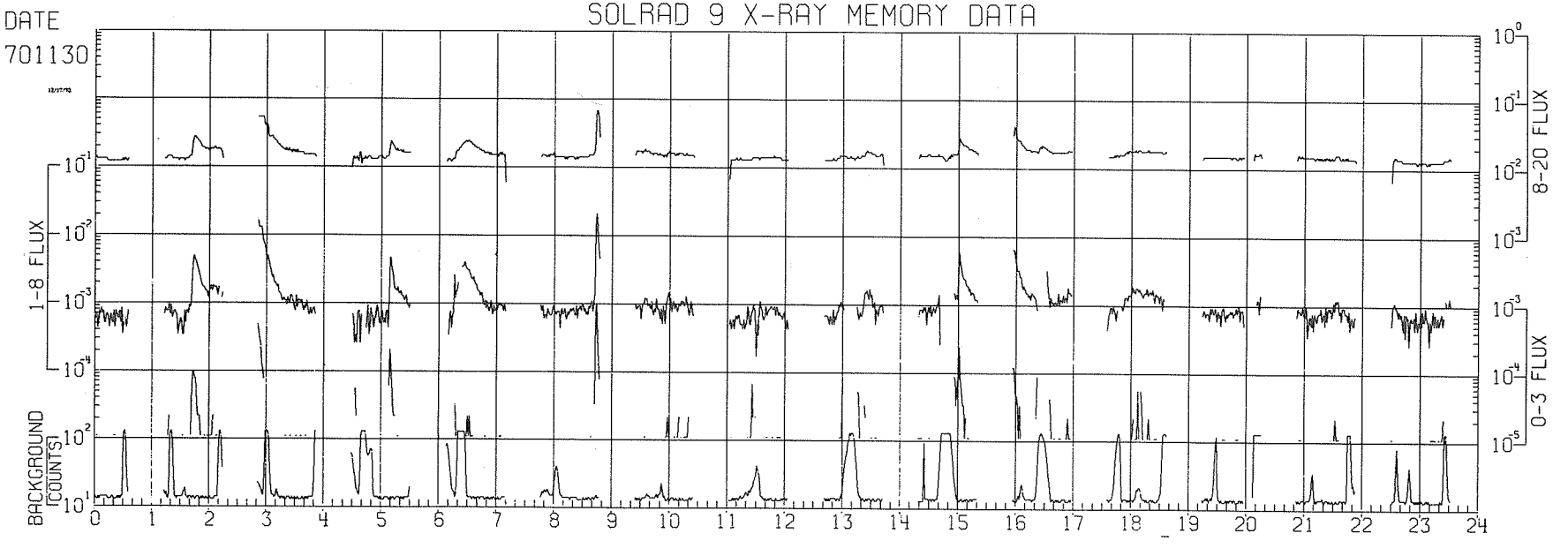
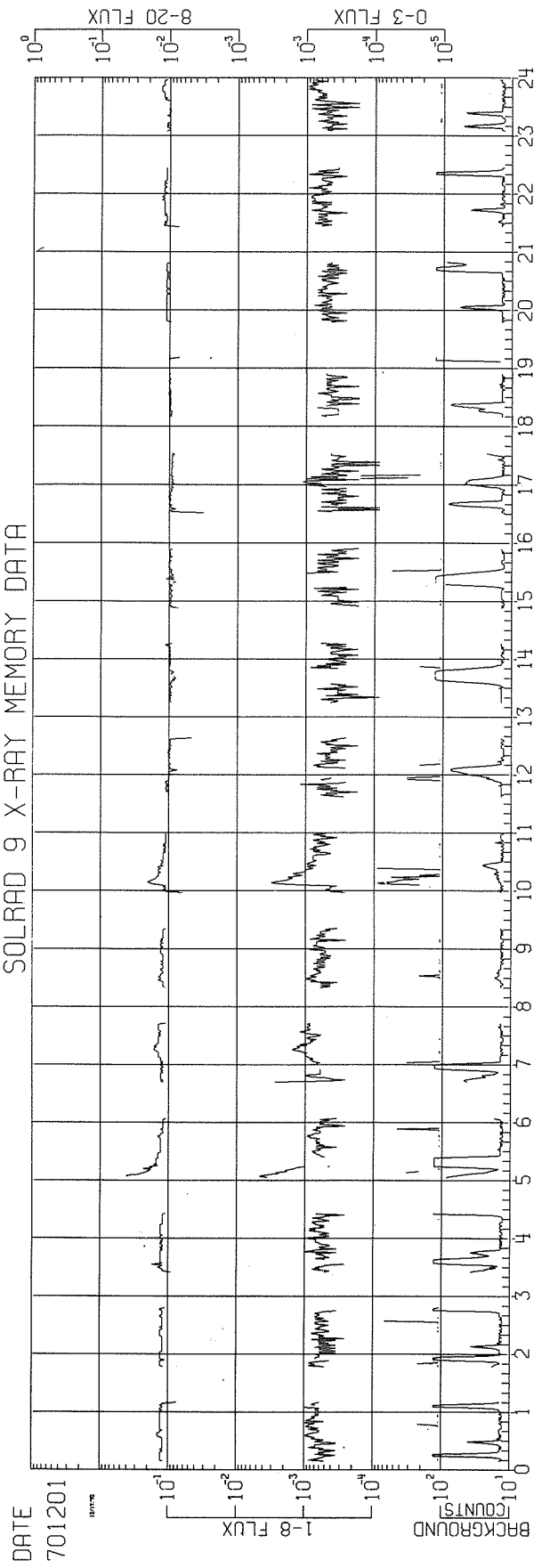
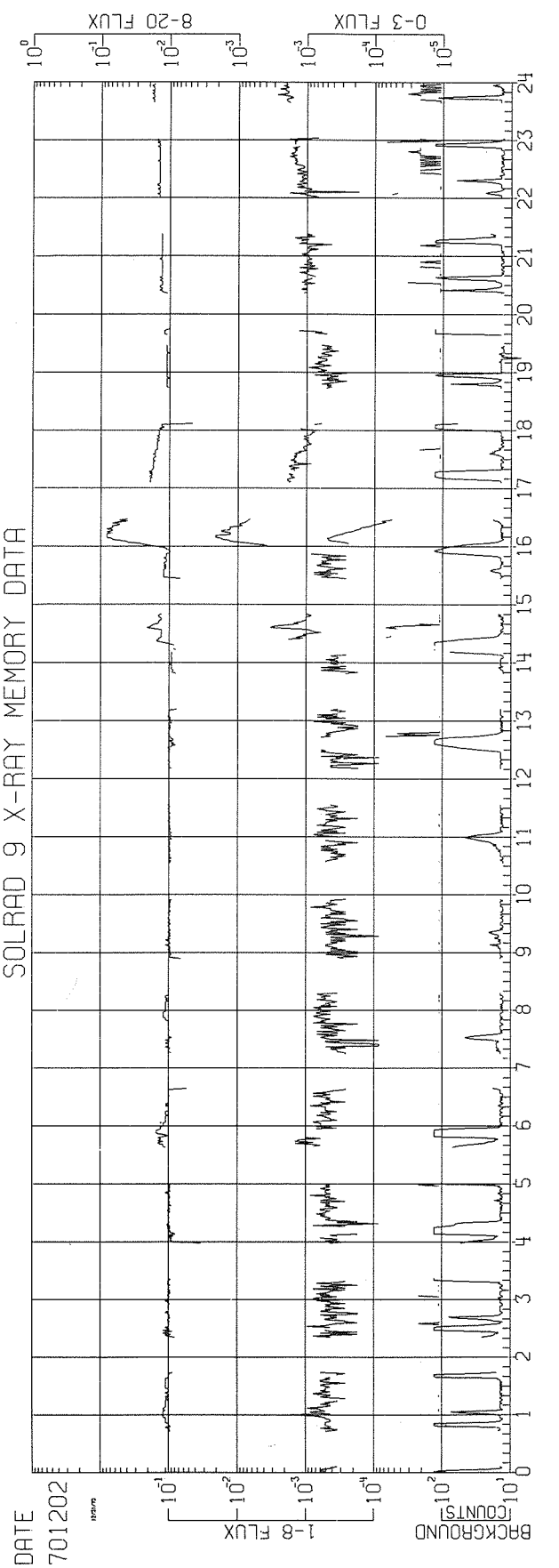
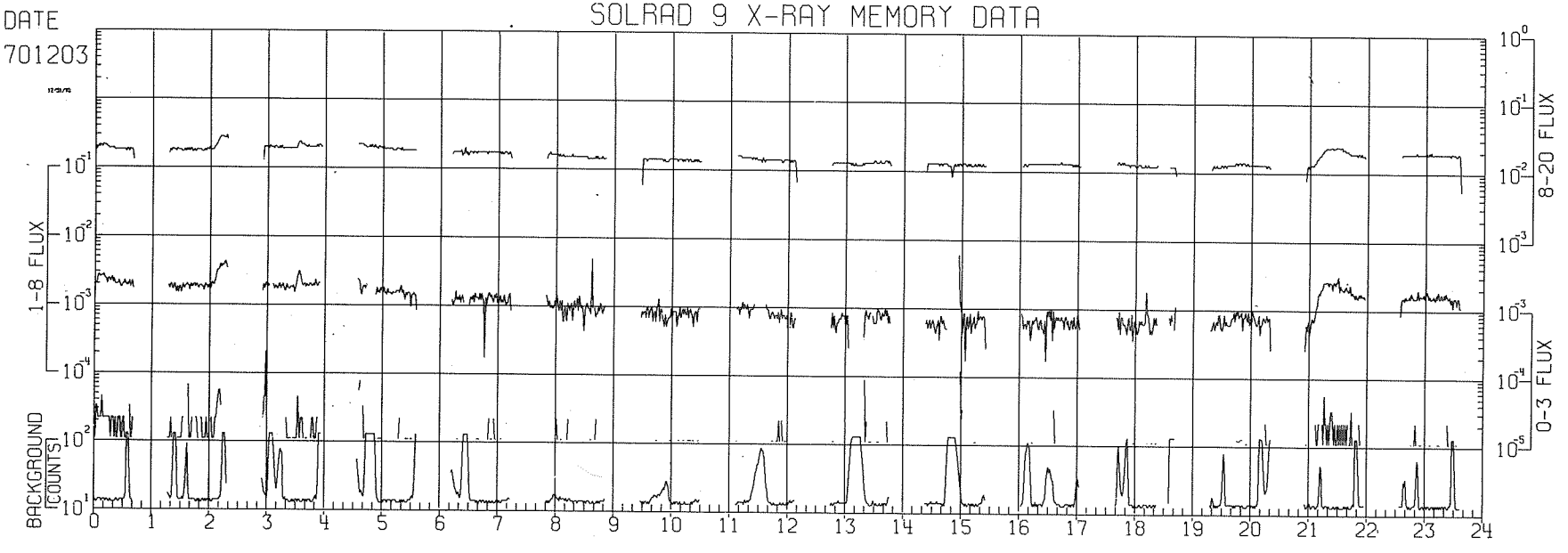
701129
November 1970
SOLRAD 9 X-RAY MEMORY DATA
1-8 FLUX
8-20 FLUX
0-3 FLUX
BACKGROUND [COUNTS]
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24


DATE
701130
SOLRAD 9 X-RAY MEMORY DATA
1-8 FLUX
8-20 FLUX
0-3 FLUX
BACKGROUND [COUNTS]
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

DECEMBER 1970






SOLRAD 9 X-RAY MEMORY DATA
DATE
701203
1-8 FLUX
BACKGROUND (COUNTS)
8-20 FLUX
0-3 FLUX
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

COSMIC RAY PROTONS

November 29 - December 3, 1970

Counting Rates (particles/sec)

Univ. of Chicago

PIONEER VI					PIONEER VII				
Date Nov.	Time (UT)	0.6-13 Mev*	13-175 Mev**	>175 Mev	Date Nov.	Time (UT)	0.6-13 Mev*	13-175 Mev**	>175 Mev
29	2400	1.20	Q	Q	29	2200	7.70	Q	Q
30	2400	0.811	Q	Q					
2	0000	2.52	Q	Q					
3	0100	1.05	Q	Q					

* Includes He 0.6-13 Mev/nucleons and electrons ∿0.5 Mev -see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleon.

Q Used to indicate that a rate is at its quiescent level.

Notes: (1) Data are subject to future determination of possible saturation during enhanced flux observations.

(2) Pioneer heliographic longitude is given in the solar wind tabulations in terms of "co-rotation" delay time (days).

(3) Unidirectional geometrical factors are 5.8×10^{-4}, 1.15×10^{-4}, 1.7×10^{-4} m^2ster for the three ascending energy intervals given above. The two higher energy intervals have a bidirectional response at energies greater than ∿100 Mev/nucleon. See Fan, Pick, Pyle, Simpson, and Smith, J. Geophys. Res., 73, 5, 1552-1582 for a description of the University of Chicago instruments.

(4) The symbol "Q" is used to indicate that a rate is at its quiescent level. Quiescent counting rates at present are approximately:
Pioneer 6 0.1, 0.055, 0.250 counts per second,
Pioneer 7 0.1, 0.055, ∿0.100 counts per second for the three ascending energy intervals.

(5) Times are only approximate (time accurate to approximately ± 15 minutes).

COSMIC RAY PROTONS

November 29 - December 3, 1970

Counting Rates (particles/sec)

University of New Hampshire

Pioneer VIII			
Date Nov.	Time (UT)	>13.9 Mev	>64 Mev
29	0430	4.13	.67
	0830	4.08	.81
	1200	4.13	.75
	1602	4.01	.72
30	1200	4.17	.72
1	0130	4.15	.76
	2330	4.06	.63
2	1300	4.00	.68
3	0100	3.82	.60
	0625	3.90	.69
	1054	4.12	.76
	1400	4.01	.66

Note: Pioneer locations given on page 49.

SOLAR PROTON MONITORING ATS-1 (1966-110A)

November 29 - December 3, 1970

AEROSPACE CORP

ENERGY LEVEL 5-21 MEV - HOURLY AVERAGES (PARTICLES $CM^{-2}SEC^{-1}$)

DATE 1970	HOUR 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Nov. 29	0.36	0.14	0.05	0.21	0.21	0.10	0.26	0.26	0.10	0.10	0.15	0.14	0.36	0.21	0.15	0.21	0.15	--	--	0.31	0.26	0.21	0.26	0.15
30	0.41	0.26	0.31	0.10	0.21	0.15	0.15	0.21	0.14	0.21	0.10	0.21	0.21	0.05	0.21	0.14	0.21	0.21	0.10	--	0.21	0.31	0.10	0.21
Dec. 01	--	--	--	--	0.10	--	0.26	0.15	0.15	0.31	0.10	0.26	0.31	0.36	--	--	--	--	--	--	--	--	0.31	0.36
02	--	0.21	0.42	0.21	0.05	0.47	0.05	0.21	0.26	0.36	0.26	0.47	0.26	0.26	0.15	0.47	0.21	0.26	0.26	0.05	0.31	0.26	0.10	0.31
03	0.21	0.31	0.21	--	0.31	0.15	0.21	0.26	0.36	0.21	0.21	0.26	0.47	0.26	0.05	0.21	--	--	0.21	--	--	--	--	0.15

ENERGY LEVEL 21-70 MEV - HOURLY AVERAGES (PARTICLES $CM^{-2}SEC^{-1}$)

DATE 1970	HOUR 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Nov. 29	0.42	0.38	0.35	0.43	0.35	0.31	0.38	0.43	0.42	0.36	0.41	0.30	0.31	0.30	0.45	0.42	0.37	--	--	0.43	0.38	0.35	0.42	0.40
30	0.47	0.42	0.37	0.31	0.29	0.32	0.33	0.33	0.36	0.38	0.37	0.34	0.41	0.35	0.41	--	0.38	0.46	0.41	0.40	0.33	0.37	0.47	0.34
Dec. 01	--	0.38	--	--	0.36	0.33	0.31	0.36	0.40	0.40	0.44	0.46	0.45	0.36	0.40	--	--	--	--	--	--	--	0.41	0.37
02	0.33	0.31	0.34	0.36	0.47	0.41	0.46	0.38	0.34	0.40	0.35	0.35	0.37	0.37	0.35	0.37	0.34	0.35	0.35	0.37	0.39	0.38	0.35	0.32
03	0.43	0.33	0.32	0.41	0.40	0.38	0.43	0.42	0.37	0.38	0.41	0.33	0.41	0.29	0.33	0.37	--	--	0.38	--	--	--	0.33	0.36

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

November - December, 1970

PROTON ENERGY GREATER THAN 60 MEV. HOURLY AVERAGES. IMPG SOLAR PROTON MONITOR. JHU/APL AND GSFC

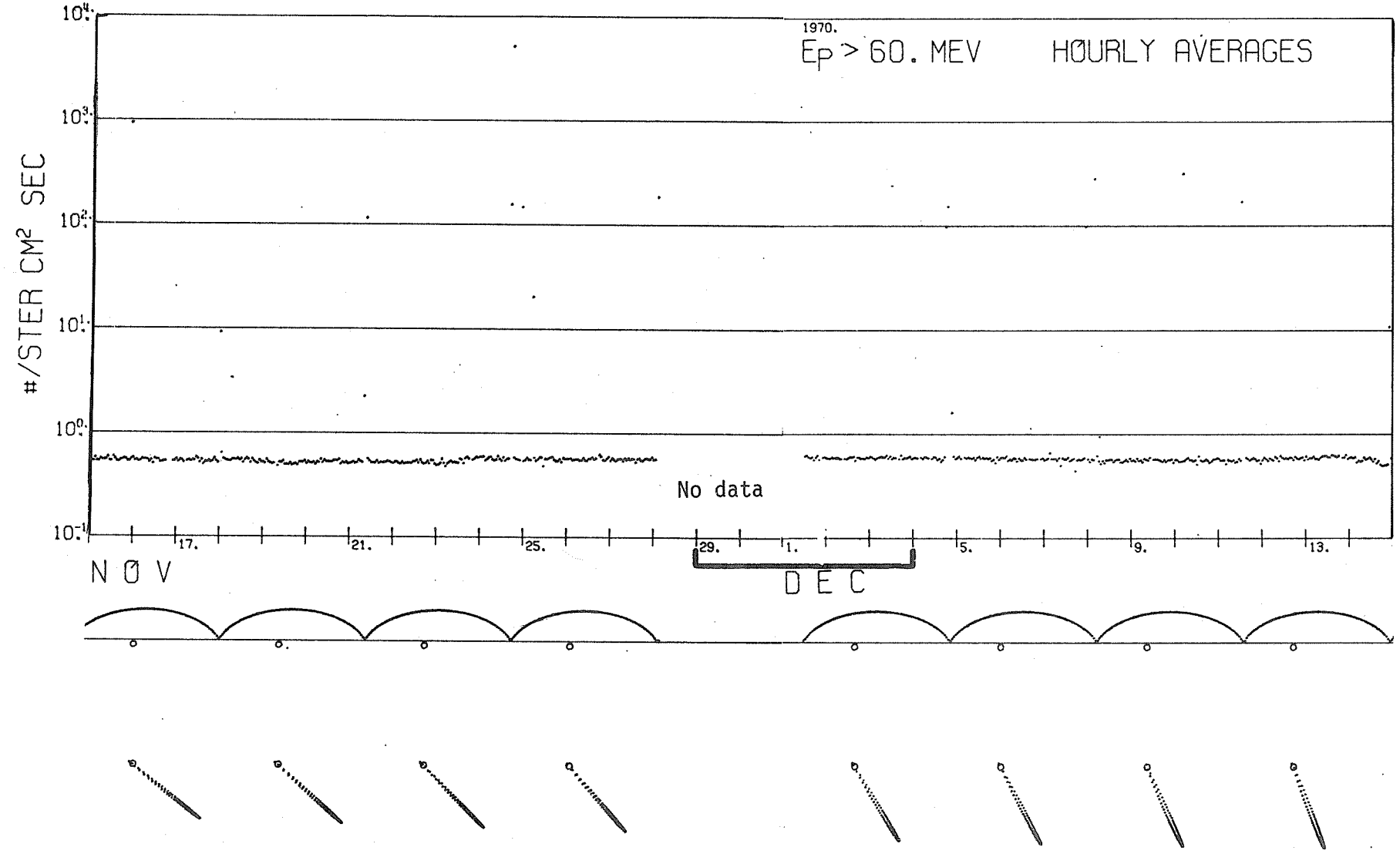
YEAR 1970

DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11 15	319	0.57	0.54	0.54	0.58	0.54	0.53	0.56	0.55	0.55	0.55	0.59	0.54	0.53	0.59	0.56	0.54	0.53	0.55	0.56	0.57	0.56	0.54	0.54	0.56
11 16	320	0.58	0.54	0.55	0.53	0.54	0.56	0.56	0.56	0.55	0.53	0.55	0.51	0.57	0.56	0.56	0.53	0.53	0.53	0.54				0.54	0.54
11 17	321	0.56	0.53	0.55	0.55	0.52		0.54	0.55	0.54	0.55	0.54	0.58	0.56	0.52	0.55	0.50	0.53	0.53	0.54	0.52	0.54	0.57	0.54	0.52
11 18	322	9.27	0.64	0.57	0.55	0.54	0.54	0.54	0.56	0.55	0.55	0.57	0.55	0.56	0.52	0.55	0.57	0.55	0.52	0.56	0.54	0.52	0.51	0.55	0.52
11 19	323	0.52	0.51	0.56	0.52	0.51	0.50	0.51		0.48	0.53	0.52	0.54	0.50	0.50	0.49	0.52	0.49	0.50	0.51	0.49	0.53	0.52	0.52	0.54
11 20	324	0.51	0.53	0.52	0.51	0.52	0.50	0.53	0.52	0.56	0.52	0.55	0.53	0.53	0.53	0.53	0.54	0.55	C.54	0.56	0.50	0.53	0.51	0.53	0.51
11 21	325	0.51	0.52	0.53	0.51	0.52	0.55	0.54	0.52	2.25	115.	0.56	0.54	0.52	0.52	0.52	0.54	0.51	0.53	0.52	0.52	0.53	0.54	0.53	0.52
11 22	326	0.51	0.53	0.53	0.52	0.51	0.53	0.51	0.52	0.52	0.52	0.51	0.53	0.53	0.55	0.52	0.55	0.52	0.51	0.52	0.54	0.51	0.55	0.55	0.51
11 23	327	0.49	0.50	0.52	0.57	0.52	0.48	0.51	0.53	0.54	0.52	0.53	0.52	0.52	0.57	0.56	0.51	0.58	0.59	0.57		0.56	0.57	0.59	0.58
11 24	328	0.59	0.60	0.60	0.55	0.57	0.59	0.59	0.56	0.55	0.56	0.60	0.57	0.55	0.59	0.55	0.57	0.57	157.	5177	0.59	0.57	0.56	0.55	148.
11 25	329	0.54	0.55	0.58	0.56	0.55	20.6	0.58	0.55	0.56	0.59	0.59	0.48	0.57	0.57	0.58	0.59	0.60	0.56	0.54	0.54	0.57	0.53	0.58	0.57
11 26	330	0.57	0.57	0.58	0.56	0.56	0.57	0.57	0.55	0.55	0.58	0.56	0.55	0.57	0.57	0.59	0.56	0.58		0.63	0.60	0.56	0.55	0.57	0.60
11 27	331	0.55	0.58	0.56	0.55	0.57	0.57	0.57	0.55	0.59	0.56	0.58	0.56	0.58	0.57	0.53	0.57	0.58	0.56	0.55	0.57	0.58	0.57	0.57	0.60
11 28	332	0.56	0.56	186.																					

No data November 29-30, 1970

12 1	335													0.60	0.62	0.60	0.58	0.60	C.56	0.59	0.62	0.56*****		0.59	0.60
12 2	336	0.59	0.58	0.58	0.59	0.58	0.60	0.59	0.58	0.57	5461	0.58	0.57	0.59	0.60	0.60	0.61	0.55	C.60	0.59	0.58	0.58	0.57	0.60	0.58
12 3	337	0.60	0.60	0.58	0.57	0.58	0.60	0.61	0.60	0.60	0.62	0.58	0.61	0.57	0.58	0.58		0.57	0.62	0.57	0.58	0.58	0.60	0.61	0.57
12 4	338	0.59	0.59	0.58		0.58	0.58	0.60	0.60	0.58		0.57	0.60	0.60	0.56	0.59	0.58	0.56	0.60	97.8	153.	*****	1.61	0.61	0.58
12 5	339	0.59	C.61	0.58*****		0.58	0.58	0.60	0.59	0.58	0.58	0.56	0.60	0.61	0.58	0.58	0.58	0.59	0.58	0.58	0.56	0.57	0.53	0.61	0.57
12 6	340	0.58	C.60	0.58	0.61	0.56	0.57	C.56	0.58	0.58	0.58	0.58	0.56	C.56	0.58	0.57		0.58	C.57	0.57	0.57	0.57		0.58	0.58
12 7	341	0.56	0.57	0.58	0.56	0.58	0.58	0.58	0.56	0.58	0.58	0.58	0.57	0.57	0.60	0.55	0.57	0.58	C.44	0.56	0.57	0.56	0.58	0.59	98.1
12 8	342	0.57	0.54	0.57	0.56	283.	0.62	0.55	0.52	0.56	0.58	0.56	0.56	0.57	C.57	0.54	0.56	0.57	0.57	0.58	0.53	0.56	0.57	0.55	0.58
12 9	343	0.55	0.56	0.55	0.58	0.55	0.56	0.54	0.58	0.57	0.56	0.60		0.57	0.58	0.57	0.57	0.56	C.54	0.57	0.54	0.57	0.55	0.58	0.53
12 10	344	0.57	0.57	0.54	0.58	0.55	0.56	0.58	0.59	0.56	0.57	0.55	0.56	0.51	0.61	0.56	0.55	0.56	0.57	0.56	0.53	0.55	0.57	0.57	0.59
12 11	345	0.58	0.56	0.56	0.57	0.52	0.57	0.56	0.55	0.57	0.54	0.56	0.58	0.56	170.		0.56	0.58	0.56	0.58	0.59	0.58	0.55	0.57	0.52
12 12	346	0.56	0.60	0.58	0.56	0.56	0.57	0.56	0.61	0.59	0.56	0.62	0.59	0.58	0.59	C.58	0.60	0.59	0.57	0.61	0.58	0.57	0.59	0.60	0.56
12 13	347	0.61	0.57	0.59	0.58	0.61	0.58	0.58	0.57	0.60	0.61	0.62	0.62	0.60	0.60	0.63	0.63	0.61	0.60	0.62		0.59	0.60	0.63	0.58
12 14	348	0.60	0.60	0.59	C.60	0.53	0.56	0.55	0.55	0.60	0.57	0.58	0.59	C.57	0.58	0.58	0.52	0.55	C.61	0.49	0.50	0.50	0.51	10.9	0.58
12 15	349	0.53	0.53	0.55	0.53	0.54	0.50	0.54	0.53	0.55	0.53	0.53	0.53	0.50	0.53	0.55	0.54	0.55	0.55	0.56	0.55	0.58	0.55	0.56	0.53

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)
November - December, 1970



SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)
November - December, 1970

PROTON ENERGY GREATER THAN 30 MEV. HOURLY AVERAGES. IMPG SOLAR PROTON MONITOR. JHU/APL AND GSFC

YEAR 1970

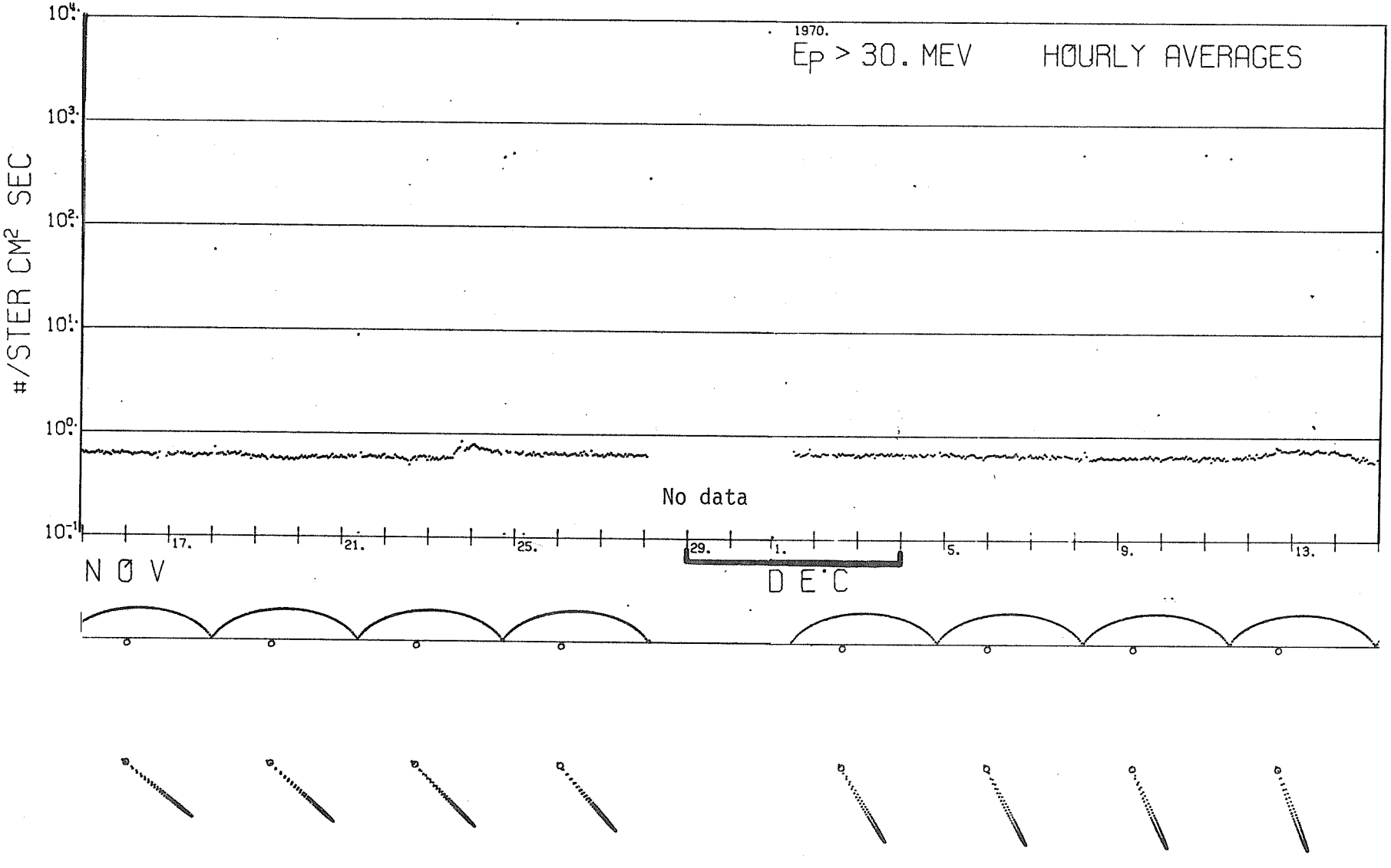
DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11 15	319	0.62	0.64	0.62	0.61	0.62	0.62	0.61	0.64	0.65	0.62	0.64	0.60	0.63	0.62	0.61	0.59	0.65	0.62	0.63	0.63	0.61	0.65	0.63	0.63
11 16	320	0.63	0.62	0.61	0.60	0.62	0.61	0.62	0.62	0.64	0.63	0.62	0.63	0.62	0.60	0.59	0.61	0.62	0.55	0.63				0.58	0.62
11 17	321	0.60	0.60	0.60	0.62	0.64		0.62	0.61	0.64	0.61	0.61	0.60	0.62	0.58	0.59	0.61	0.62	0.61	0.61	0.62	0.61	0.59	0.61	0.62
11 18	322	57.5	0.72	0.61	0.62	0.62	0.63	0.61	0.60	0.65	0.61	0.63	0.63	0.64	0.61	0.62	0.65	0.59	0.60	0.62	0.60	0.60	0.56	0.60	0.59
11 19	323	0.58	0.59	0.58	0.61	0.59	0.58	0.55		0.58	0.60	0.57	0.57	0.57	0.58	0.57	0.55	0.57	0.58	0.55	0.57	0.57	0.55	0.57	0.56
11 20	324	0.58	0.60	0.57	0.59	0.57	0.59	0.58	0.60	0.59	0.61	0.57	0.58	0.58	0.59	0.59	0.60	0.57	0.59	0.62	0.58	0.60	0.58	0.58	0.61
11 21	325	0.58	0.58	0.57	0.62	0.60	0.61	0.59	0.60	8.88*****		0.65	0.59	0.59	0.59	0.61	0.62	0.60	0.60	0.61	0.58	0.60	0.58	0.62	0.63
11 22	326	0.58	0.59	0.58	0.58	0.58	0.63	0.60	0.58	0.58	0.59	0.57	0.56	0.55	0.50	0.55	0.59	0.60	0.56	0.60	0.61	0.60	0.61	0.60	0.56
11 23	327	0.60	0.56	0.59	0.56	0.59	0.56	0.57	0.58	0.61	0.57	0.59	0.58	0.59	0.59	0.65	0.68	0.73	0.74	0.85		0.69	0.73	0.72	0.76
11 24	328	0.79	0.79	0.76	0.74	0.72	0.73	0.73	0.71	0.72	0.70	0.70	0.67	0.68	0.69	0.70	0.67	0.64	465.*****		0.69	0.67	0.67	508.11199	
11 25	329	0.67	0.66	0.64	0.65	0.68*****		0.63	0.64	0.65	0.63	0.67	0.63	0.65	0.65	0.62	0.61	0.66	0.67	0.64	0.65	0.66	0.64	0.68	0.65
11 26	330	0.64	0.65	0.64	0.67	0.64	0.62	0.63	0.65	0.65	0.66	0.64	0.63	0.67	0.63	0.70	0.65	0.63		0.70	0.64	0.65	0.65	0.63	0.63
11 27	331	0.64	0.61	0.63	0.66	0.65	0.68	0.64	0.64.	0.63	0.65	0.65	0.63	0.62	0.66	0.62	0.65	0.65	0.64	0.62	0.64	0.64	0.64	0.64	0.64
11 28	332	0.65	0.62	297.																					

No data November 29-30, 1970

12 1	335													0.71	0.65	0.66	0.68	0.63	0.65	0.66	0.67	0.69	0.75	0.66	0.64
12 2	336	0.66	0.65	0.64	0.63	0.67	0.67	0.66	0.65			0.67	0.66	0.63	0.68	0.65	0.68	0.66	0.66	0.66	0.66	0.66	0.67	0.62	0.64
12 3	337	0.65	0.62	0.64	0.65	0.68	0.66	0.65	0.67	0.68	0.62	0.67	0.66	0.68	0.68	0.65	0.65	0.68	0.66	0.68	0.65	0.66	0.68	0.66	0.66
12 4	338	0.67	0.62	0.66		0.66	0.66	0.63	0.66	0.65		0.67	0.65	0.64	0.65	0.68		0.67	0.65	0.67**********				0.71	0.66
12 5	339	0.68	0.67	0.65	0.70	0.68	0.66	0.65	0.67	0.65	0.63	0.66	0.62	0.65	0.66	0.67	0.67	0.66	0.64	0.63	0.64	0.64	0.60	0.63	0.65
12 6	340	0.66	0.66	0.67	0.67	0.66	0.65	0.65	0.65	0.66	0.67	0.64	0.64	0.64	0.64	0.66	0.60	0.66	0.61	0.64	0.65	0.63*****		0.66	0.68
12 7	341	0.64	0.63	0.65	0.63	0.66	0.64	0.63	0.68	0.66*****		0.62	0.67	0.65	0.62	0.66	0.65	0.64*****		0.66	0.65	0.65	0.64	0.63*****	
12 8	342	0.63	0.63	0.63	0.63	516.	0.73	0.65	4.72	0.60	0.60	0.62	0.60	0.63	0.62	0.64	0.63	0.62	0.62	0.63	0.62	0.62	0.63	0.62	0.62
12 9	343	0.61	0.62	0.64	0.63	0.61	0.62	0.64	0.62	0.62	0.64	0.62		0.63	0.64	0.65	0.63	0.64	0.67	0.63	0.61	0.65	0.65	0.63	0.60
12 10	344	0.62	0.62	0.63	0.64	0.65	0.66	0.62	0.64	0.64	0.63	0.64	0.65	0.63	0.67	0.63	0.65	0.64	0.61	0.61	0.62	0.59	0.62	0.64	0.66
12 11	345	0.64	0.64	0.65	0.66	0.64	0.62	0.65	0.64	0.62	0.61	0.64	0.61	0.61	492.		0.64	0.63	0.65	0.63	0.68	0.62	0.64	0.67	0.64
12 12	346	0.69	0.65	0.65	0.63	0.71	0.64	0.65	0.66	0.65	0.72	0.69	0.70	0.70	0.70	0.73	0.91	0.78	0.77	0.74	0.75	0.75	0.73	0.74	0.76
12 13	347	0.75	0.75	0.76	0.78	0.71	0.73	0.76	0.73	0.74	0.72	0.70	0.72	0.75	0.76	0.77	0.74	0.74	0.73	0.74		0.71	0.74	0.74	0.76
12 14	348	0.73	0.73	0.70	0.70	0.69	0.69	0.71	0.71	0.71	0.66	0.65	0.63	0.65	0.60	0.62	0.67	0.62	0.64	0.59	0.60	0.59	0.57	65.0	0.62
12 15	349	0.68	0.62	0.66	0.64	0.59	0.60	0.61	0.58	0.59	0.59	0.62	0.60	0.61	0.59	0.63	0.59	0.62	0.60	0.62	0.61	0.64	0.64	0.62	0.66

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)

November - December, 1970



SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969-53A)
November - December, 1970

PROTON ENERGY GREATER THAN 10 MEV. HOURLY AVERAGES. IMP6 SOLAR PROTON MONITOR. JHU/APL AND GSFC

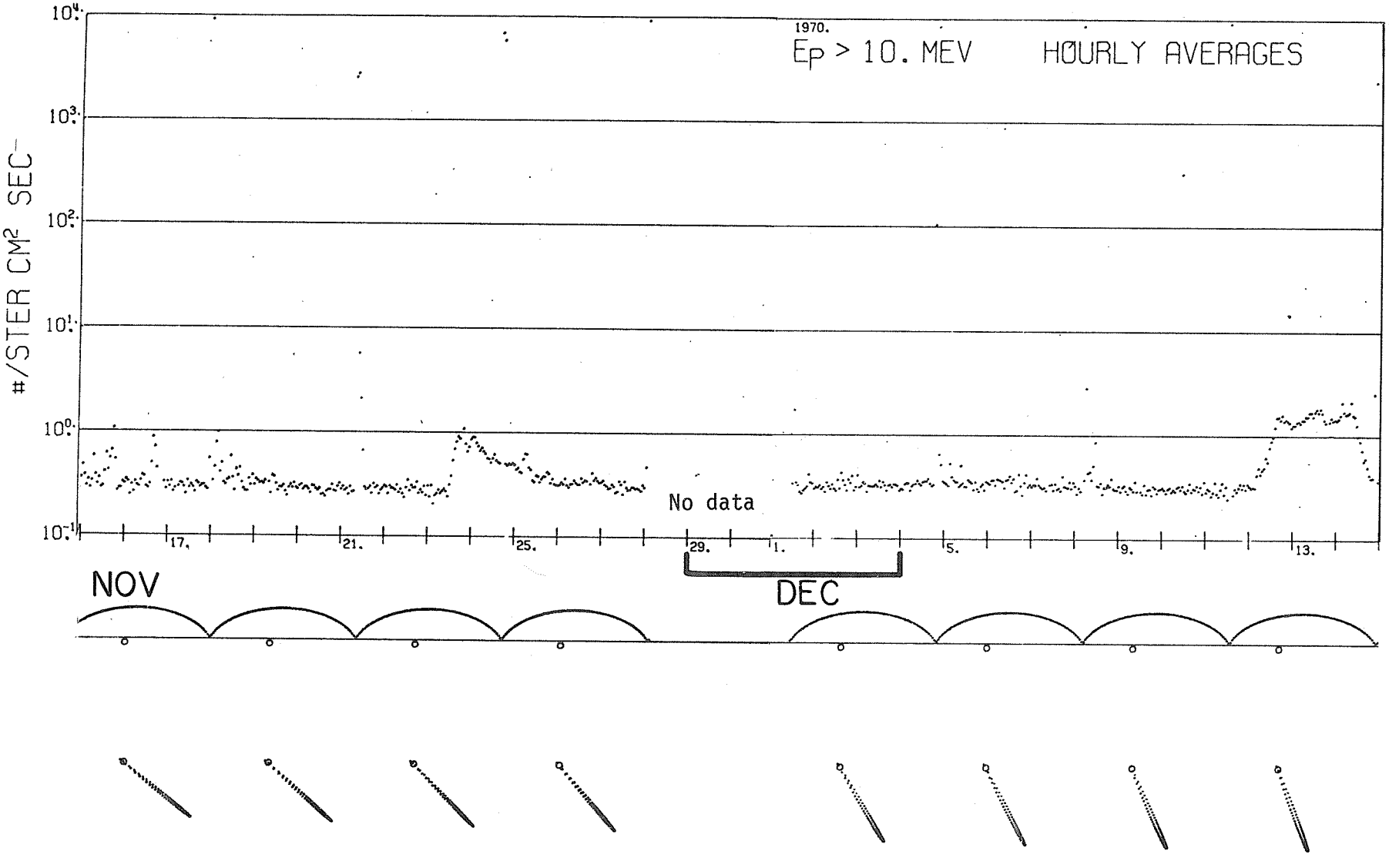
YEAR 1970

DATE	DAY OF YEAR	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11 15	319	0.36	0.48	0.38	0.30	0.34	0.29	0.34	0.58	0.38	0.31	0.36	0.29	0.30	0.41	0.62	0.43	0.55	0.66	1.07	0.54	0.27	0.29	0.28	0.33
11 16	320	0.32	0.35	0.33	0.25	0.31	0.26	0.33	0.31	0.30	0.34	0.38	0.37	0.30	0.29	0.31	0.50	0.88	C.71	0.45				0.33	0.28
11 17	321	0.33	0.30	0.33	0.27	0.29		0.30	0.32	0.32	0.29	0.25	0.34	0.29	0.31	0.29	0.26	0.33	0.32	0.29	0.31	0.31	0.29	0.28	0.55
11 18	3221	4289	0.34	0.46	0.79	0.99	0.41	0.50	0.33	0.31	0.34	0.35	0.58	0.36	0.27	0.44	0.38	0.45	0.33	0.28	0.27	0.27	0.35	0.31	0.38
11 19	323	0.31	0.35	0.34	0.32	0.33	0.32	0.34		0.33	0.26	0.38	0.37	0.32	0.27	0.30	0.29	0.31	0.27	0.24	0.29	0.31	0.29	0.32	0.29
11 20	324	0.28	0.30	0.31	0.28	0.30	0.30	0.28	0.26	0.31	0.30	0.29	0.28	0.29	0.25	0.25	0.24	0.27	0.28	0.28	0.31	0.27	0.27	0.30	0.32
11 21	325	0.28	0.30	0.28	0.29	0.25	0.30	0.27	0.27	2566	2791	5.65	2.09	0.67	0.30	0.28	0.29	0.30	0.26	0.32	0.29	0.30	0.26	0.28	0.29
11 22	326	0.31	0.30	0.26	0.31	0.29	0.29	0.28	0.31	0.26	0.28	0.26	0.24	0.29	0.35	0.28	0.31	0.29	C.29	0.34	0.26	0.28	0.26	0.30	0.25
11 23	327	0.31	0.24	0.31	0.21	0.25	0.26	0.28	0.26	0.27	0.29	0.27	0.24	0.31	0.38	0.54	0.69	0.82	0.91	0.87		1.09	0.77	0.66	0.73
11 24	328	0.86	0.90	0.90	0.79	0.74	0.66	0.71	0.66	0.63	0.57	0.56	0.51	0.57	0.61	0.54	0.52	0.51	6883	5826	0.50	0.48	0.50	0.49	0.51
11 25	329	0.49	0.44	0.46	0.42	0.41	0.56	0.63	0.62	0.47	0.44	0.35	0.34	0.39	0.38	0.33	0.36	0.38	0.38	0.42	0.40	0.33	0.36	0.32	0.32
11 26	330	0.31	0.32	0.33	0.32	0.36	0.31	0.30	0.32	0.33	0.35	0.33	0.32	0.32	0.37	0.34	0.35	0.34		0.32	0.41	0.35	0.37	0.35	0.33
11 27	331	0.34	C.35	0.32	0.31	0.29	0.30	0.32	0.31	0.27	0.27	0.34	0.32	0.26	0.34	0.30	0.28	0.29	0.30	0.30	0.29	0.30	0.29	0.28	0.32
11 28	332	0.30	0.4717267																						

No data November 29-30, 1970

12 1	335													0.34	1.73	0.34	0.32	0.28	C.27	0.29	0.30	0.32	0.41	0.35	0.34
12 2	336	0.30	C.31	C.31	0.32	0.30	0.31	0.28	0.35	0.32	0.30	0.33	0.30	0.29	0.37	0.30	0.43	C.36	C.33	0.29	0.37	0.34	0.40	0.29	0.31
12 3	337	0.41	0.31	0.32	0.35	0.34	0.28	0.32	0.32	0.32	0.32	0.33	0.32	0.36	0.31	0.35	0.33	0.29	C.33	0.33	0.31	0.33	0.33	0.32	0.29
12 4	338	0.30	0.30	0.34	0.34	0.34	0.29	0.32	0.33	0.34	C.36	0.34	0.33	0.35	0.36	C.36	0.39	C.34	C.32	0.33	103.	8428	C.65	0.52	0.36
12 5	339	0.35	0.34	0.32	0.33	0.40	0.37	0.35	0.35	0.32	0.33	0.34	0.32	0.32	C.37	0.36	0.35	0.30	C.35	0.30	0.29	0.32	0.34	0.29	0.36
12 6	340	0.35	0.34	0.37	0.37	0.33	0.36	0.37	0.37	0.36	0.31	0.37	0.37	0.40	0.35	C.36	0.29	C.29	C.42	0.33	0.26	0.35	0.42	0.32	0.33
12 7	341	0.32	0.33	0.33	0.36	0.33	0.32	0.31	0.31	0.29		0.33	0.34	C.29	0.34	C.30	0.31	C.29	0.40	0.32	0.32	0.31	0.35	0.31	0.35
12 8	342	0.33	0.27	0.31	C.29	5573	0.37	2.95	0.43	0.44	0.37	0.51	0.86	0.33	0.32	0.35	0.27	0.31	0.32	C.34	0.32	0.38	0.31	0.30	0.30
12 9	343	0.33	C.29	0.32	0.33	0.29	0.27	0.32	0.31	0.29	0.36	0.29		0.29	0.27	0.34	0.27	0.30	C.30	0.27	0.32	0.31	0.28	0.30	0.31
12 10	344	0.31	0.30	0.29	0.31	0.31	0.29	0.30	0.29	0.32	0.32	0.30	0.33	0.29	C.29	0.30	0.35	C.29	C.31	0.30	0.33	0.29	0.32	0.28	0.36
12 11	345	0.28	0.31	0.30	0.26	0.28	0.35	0.29	0.26	0.30	0.35	0.27	0.32	C.24	10775		0.27	0.31	C.29	0.32	0.34	0.31	0.34	0.30	0.34
12 12	346	0.33	0.31	0.32	0.32	0.42	0.49	0.43	0.47	0.49	0.62	0.55	0.77	C.99	C.98	1.21	1.50	1.52	1.43	1.58	1.35	1.44	1.39	1.35	1.20
12 13	347	1.27	1.27	1.36	1.37	1.33	1.43	1.42	1.54	1.58	1.69	1.69	1.54	1.71	1.81	1.68	1.83	1.67	1.43	1.34		1.37	1.50	1.41	1.44
12 14	348	1.41	1.47	1.59	2.12	1.71	1.62	1.64	1.70	2.14	1.59	1.55	1.27	0.99	0.89	C.73	0.57	0.61	C.50	0.42	0.39	0.39	2.55	2502	0.37
12 15	349	0.40	0.58	2.94	4.49	1.24	0.58	0.95	0.70	0.87	0.50	1.33	0.90	0.45	0.38	0.39	0.40	0.45	C.41	0.49	0.43	0.42	0.42	0.39	0.37

SOLAR PROTONS BY SATELLITE
EXPLORER 41 (1969 53A)
November - December, 1970



SOLAR WIND
VELA 3 & 5

November 29 - December 3, 1970

Date Nov. 1970	UT	Spacecraft	Velocity V_{H^+} (km/sec)	Density N_{H^+} (cm^{-3})
29	0700	5B	446	--
	0500	5B	446	1.3
	1600	5B	424	--
	1800	5B	404	1.6
	1400	5B	384	--

SOLAR WIND VELOCITY

and

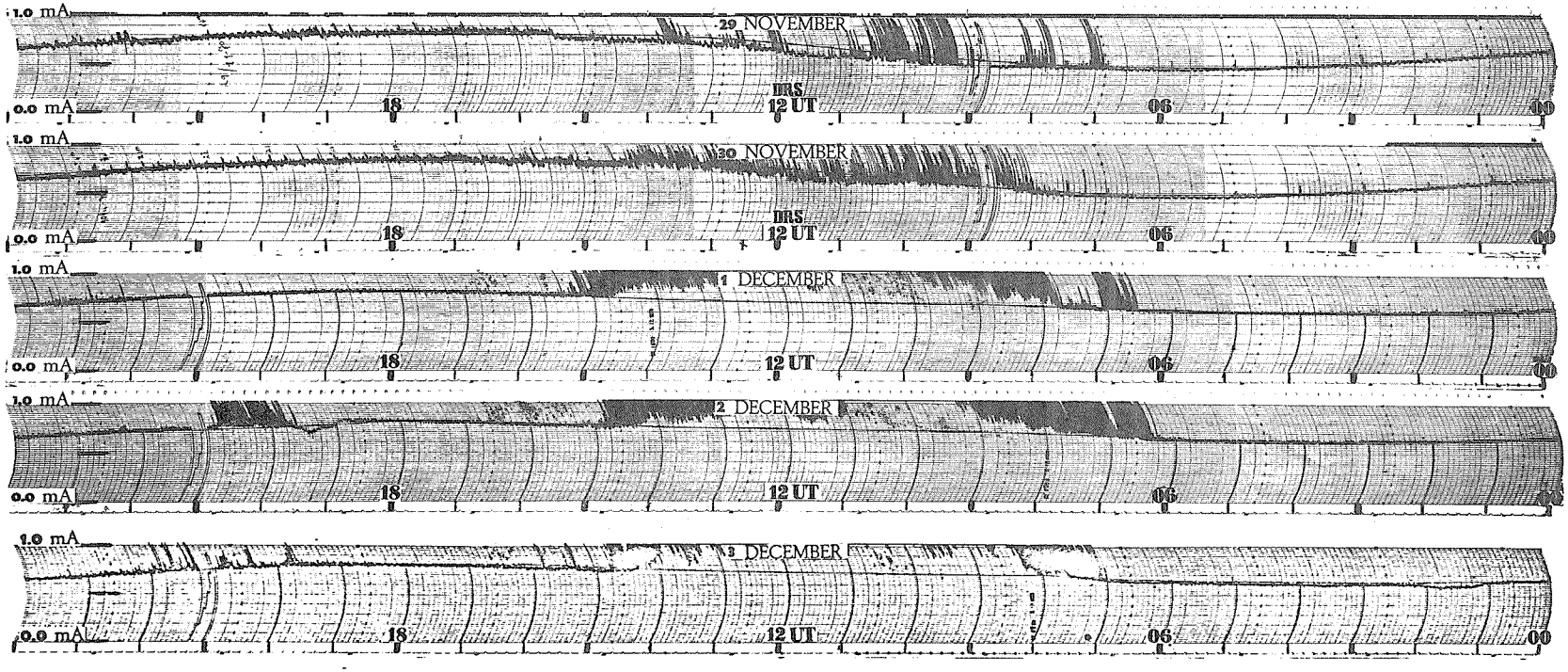
CO-ROTATION DELAY TIMES

November - December 1970

NASA Ames Research Center

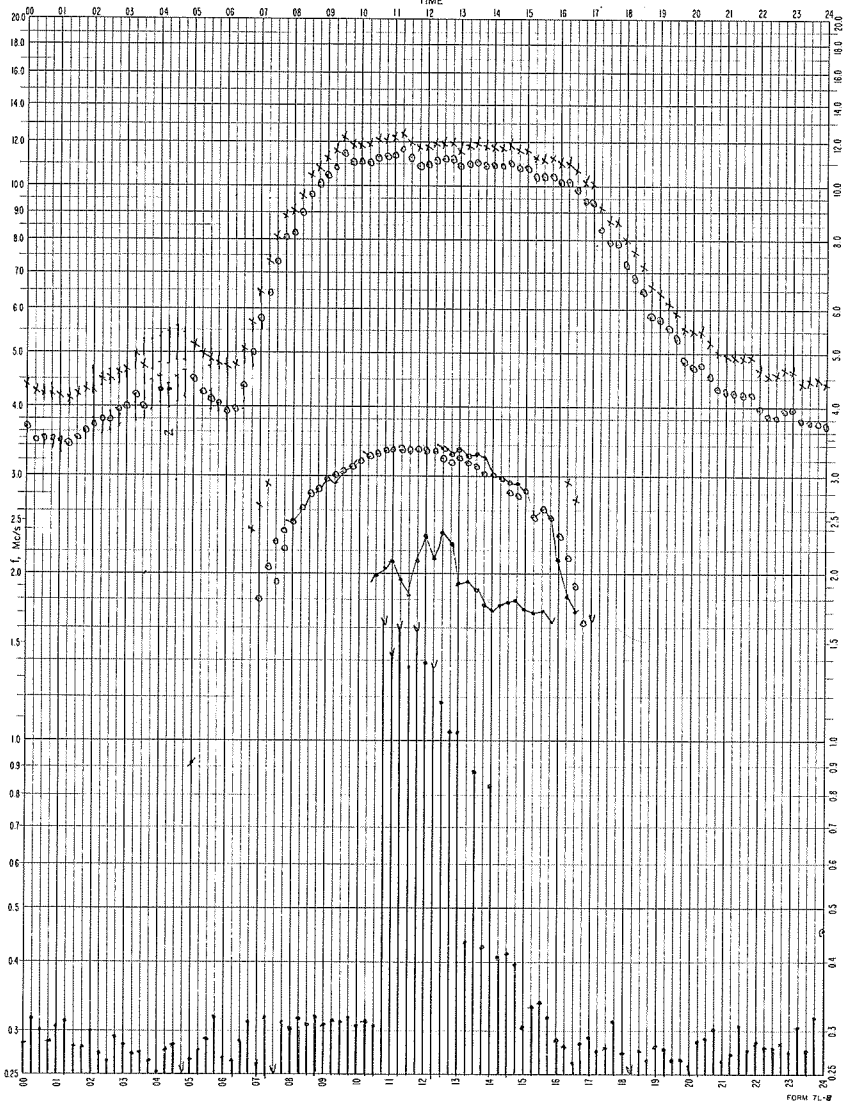
DATE 1970	PIONEER VI				PIONEER VII			
	Time (Z)	Pass	U_{H^+}	TAU	Time (Z)	Pass	U_{H^+}	TAU
November								
29	0105	1809	302	3.3	0005	1565	341	11.0
30	0049	1810	302	3.3	0012	1566	388	11.1
December								
1	2350	1812	383	3.3				
2								
3	0057	1813	339	3.3				

KIRUNA, VERTICAL RIOMETER 27.6 MHz
1970



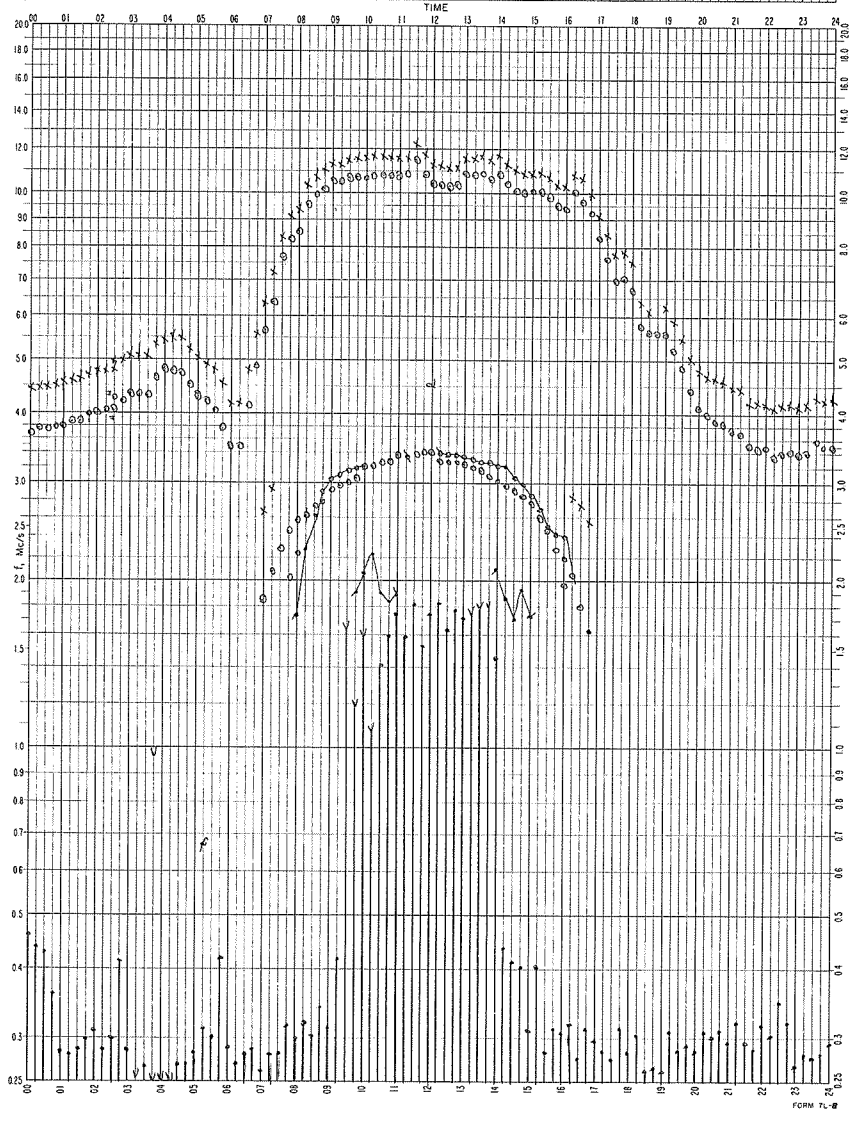
November 29, 1970

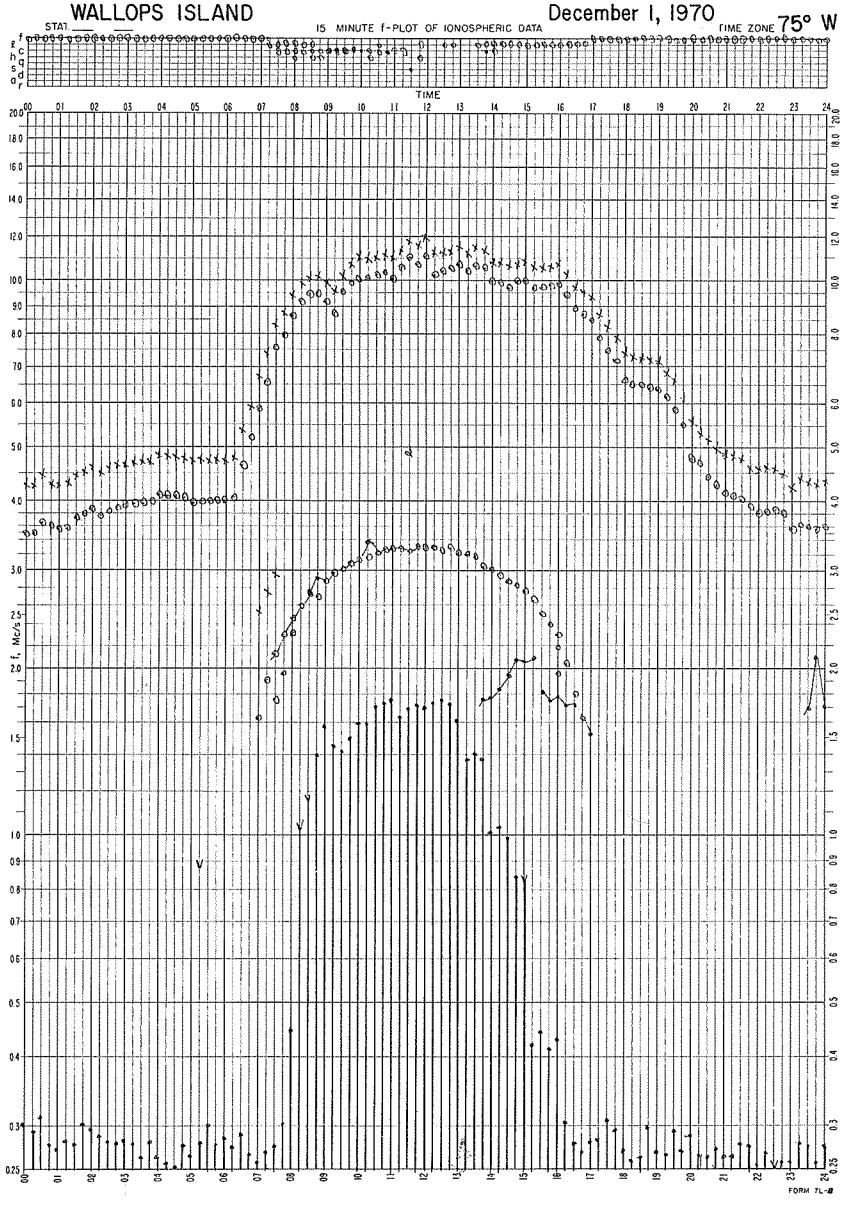
STAT WALLOPS ISLAND 15 MINUTE f-PLOT OF IONOSPHERIC DATA TIME ZONE 75° W

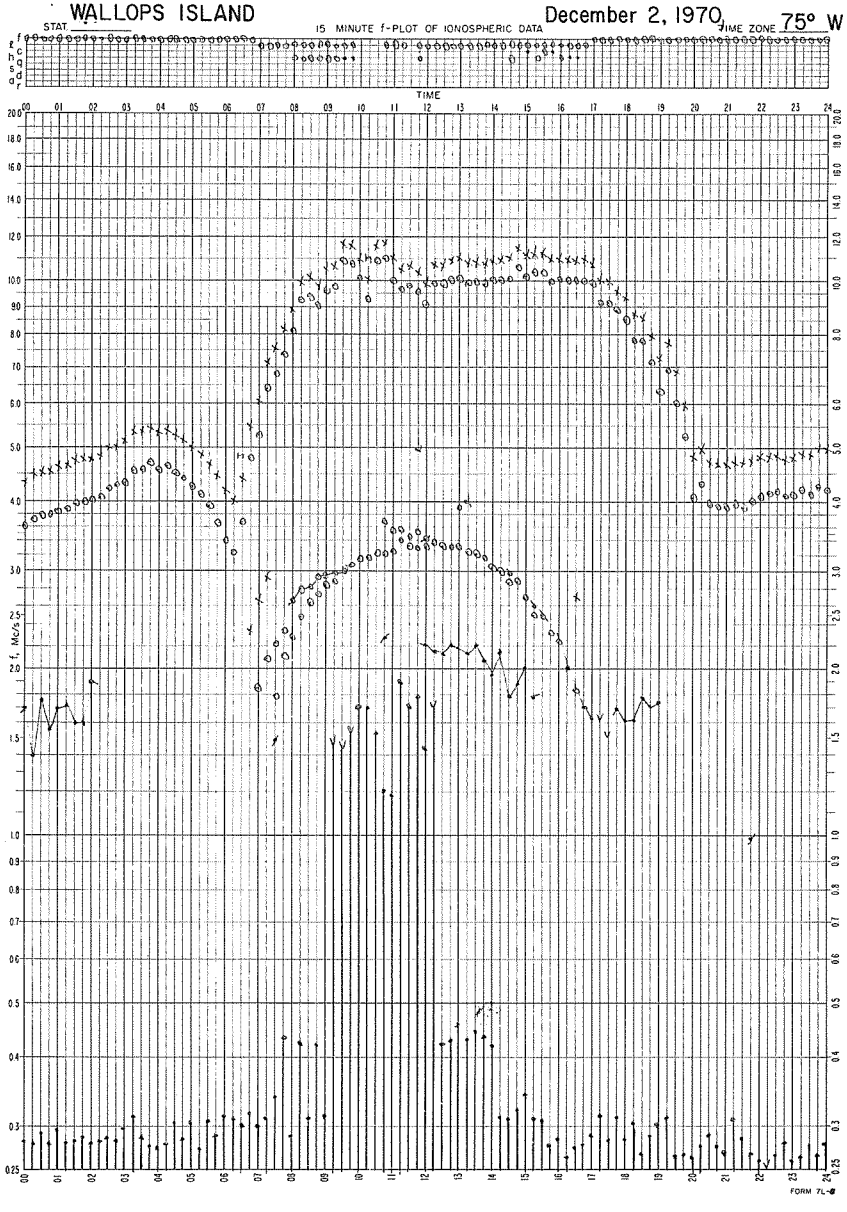


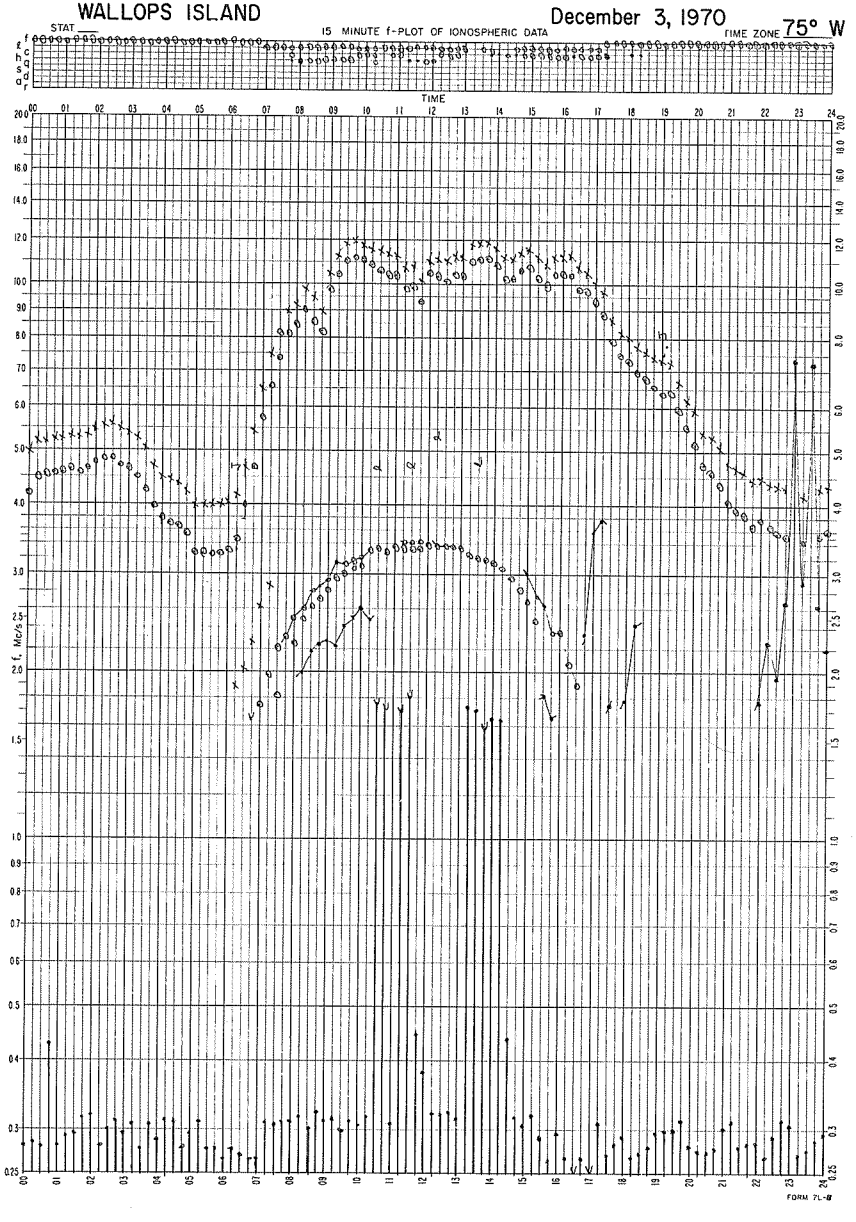
November 30, 1970

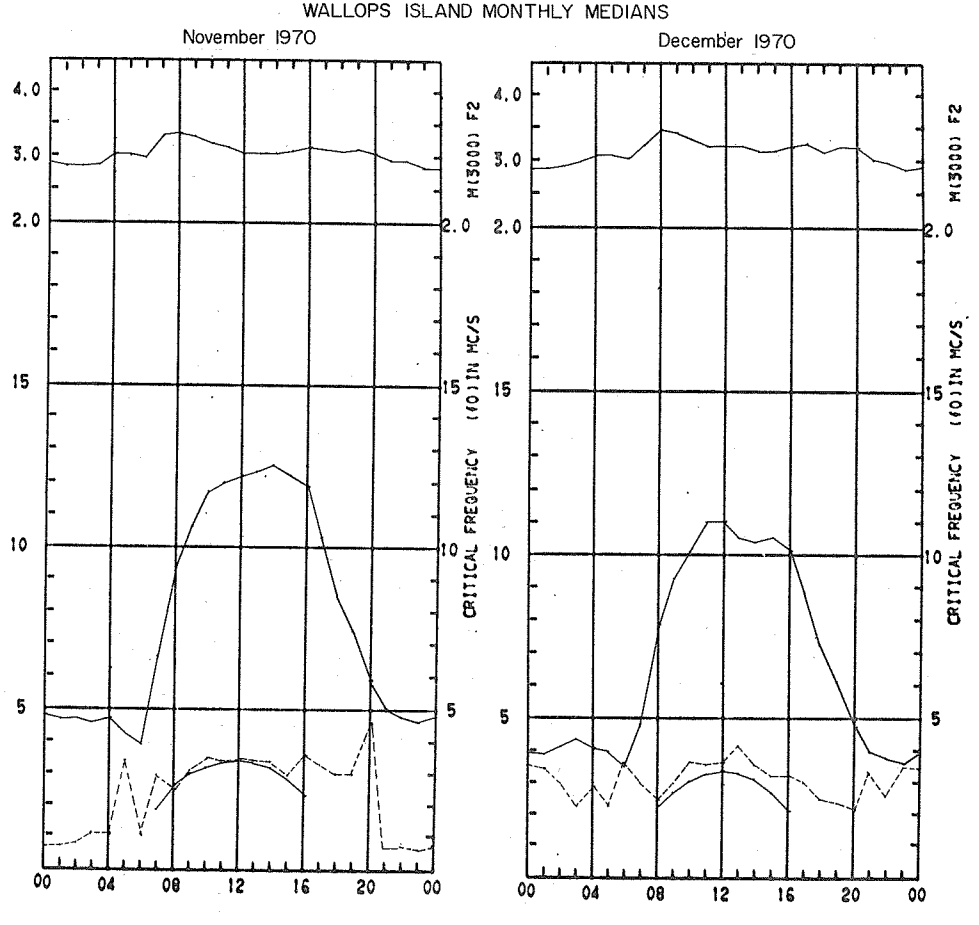
STAT WALLOPS ISLAND 15 MINUTE f-PLOT OF IONOSPHERIC DATA TIME ZONE 75° W

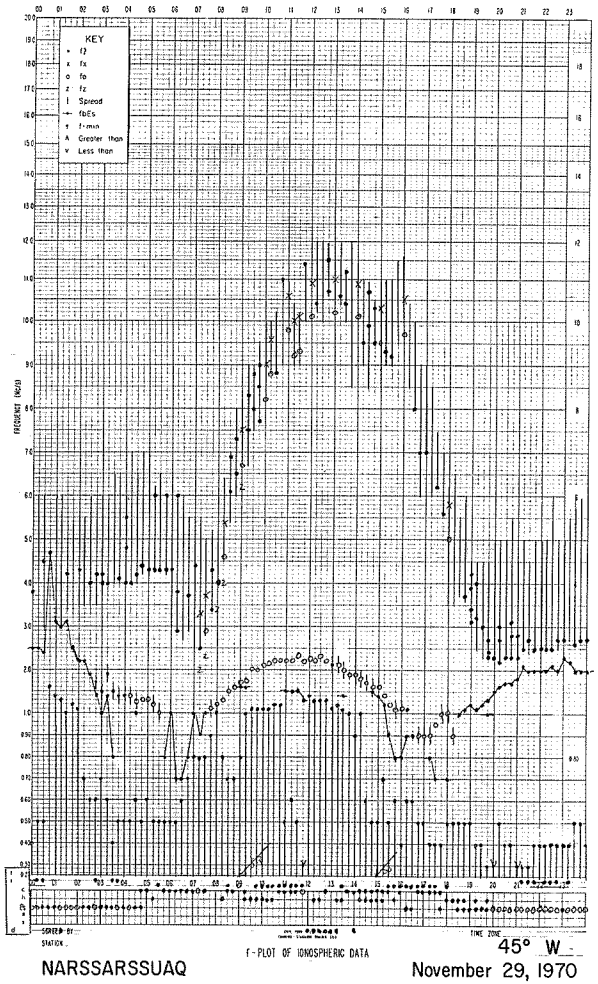



WALLOPS ISLAND
December 1, 1970
STAT.
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
TIME
f, Mc/s
FORM 7L-8


WALLOPS ISLAND
December 2, 1970
STAT.
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
TIME
f, Mc/s
FORM 7L-8

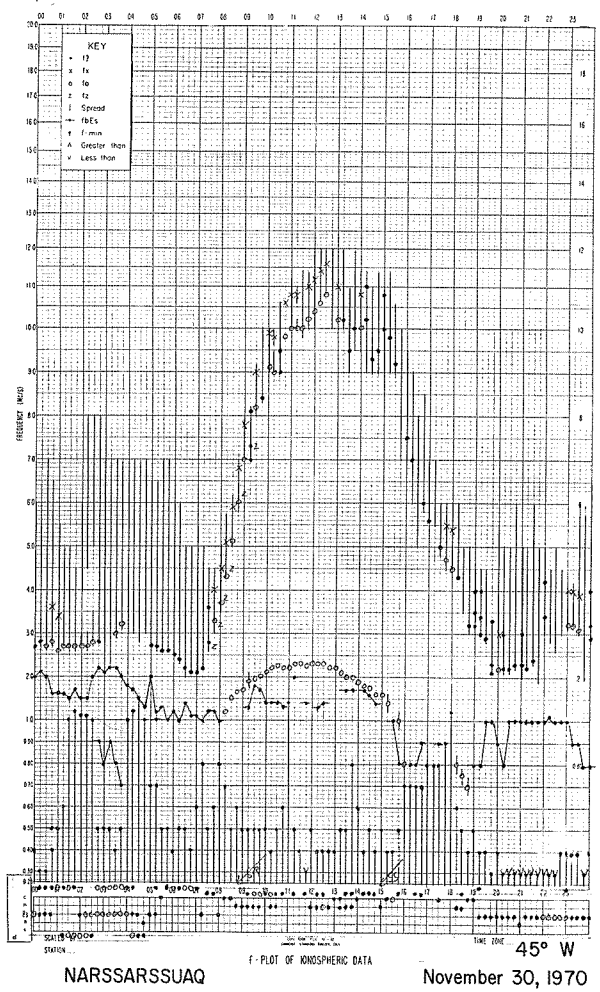

WALLOPS ISLAND
December 3, 1970
STAT
15 MINUTE f-PLOT OF IONOSPHERIC DATA
TIME ZONE 75° W
TIME
f, Mc/s
FORM 7L-8


WALLOPS ISLAND MONTHLY MEDIANS
November 1970
December 1970
M(3000) F2
CRITICAL FREQUENCY (fO) IN MC/S
00
04
08
12
16
20
00



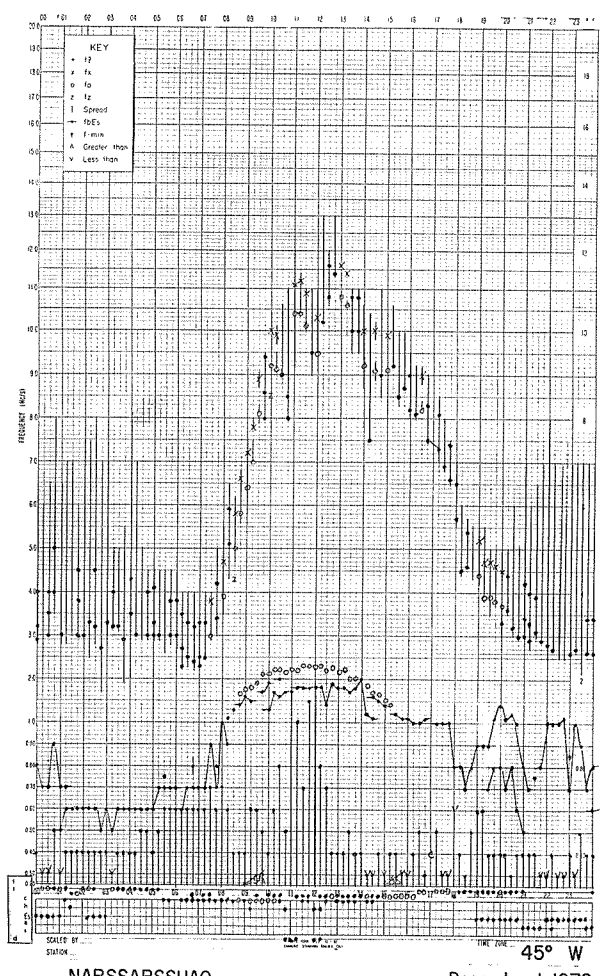
f-PLOT OF IONOSPHERIC DATA

NARSSARSSUAQ 45° W November 29, 1970

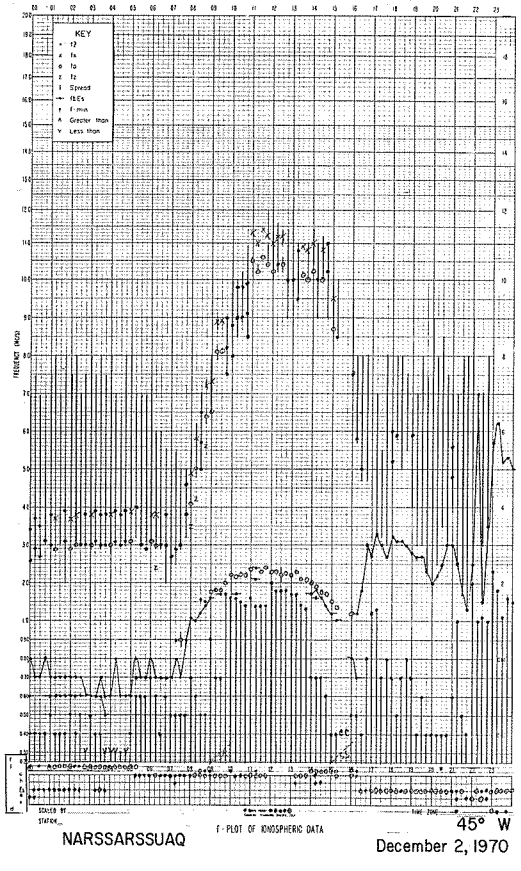


f-PLOT OF IONOSPHERIC DATA

NARSSARSSUAQ 45° W November 30, 1970

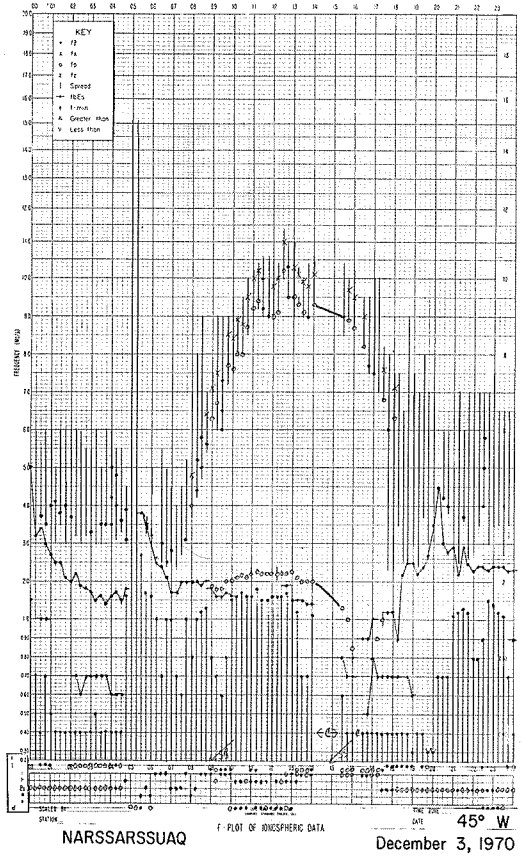


NARSSARSSUAQ 45° W December 1, 1970



NARSSARSSUAQ

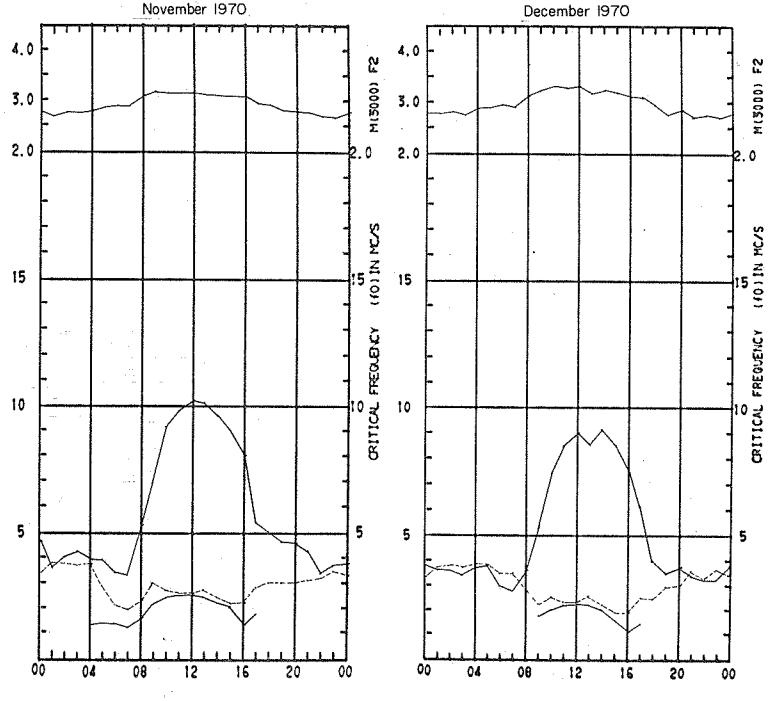
December 2, 1970



NARSSARSSUAQ

December 3, 1970

NARSSARSSUAQ MONTHLY MEDIANS



SUDDEN IONOSPHERIC DISTURBANCES

November 29 - December 3, 1970

DAY 1970	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
Nov 29	2050	2126	2101	1-	3				6	1	2		2050	11060
30	0245	0307	0250	1	3	1			1	1	1		0238	11060
30	0842	0900	0844	1	3	1		1	2		2		0842	11066
30	1500	1530		1-	3				2				1501	11066
30	1550	1700		1-	3				2				1553	11066
Dec 01	0454	0524	0502	1-	3	1			2		1		0454	X-Ray
02	1601	1725	1614	1	5	2		2	3	4	6		1558	11063
03	0416	0439	0426	1-	3				2				0420	11071

Stations reporting for November 1970 include those reporting for December (with the exception of Sao Paulo) and also the following:

BAHRAIN (BH) (SWF)
BARBADOS (BA) (SWF)
HOKKAIDO (LORAN-C) (HO) (LF-SPA, SES)
HONGKONG (HK) (SWF)
ROME (RO) (SCNA)
SLOUGH (SL) (SPA)

STATIONS REPORTING FOR DECEMBER 1970

AAVSO (A1, A6, A8, A17, A19, A27, A29) (SEA) (A2, A4, A19, A21) (SES)
ANCHORAGE (AN) (SWF, SCNA, SPA)
ATHENS (AT) (SWF)
ATTU (LORAN-C) (TT) (LF-SPA, SES)
BEARLEY (BY) (SWF)
BOULDER (BO) (SCNA, SEA)
CAPE RACE (LORAN-C) (CP) (LF-SPA, SES)
DARMSTADT (DA) (SWF)
ENKOPING (SW) (SWF, SPA)
FORESTPORT (FP) (SPA)
GESASHI (LORAN-C) (GE) (LF-SPA, SES)
HAWAII (HA) (SPA, SFD)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
JUPITER (LORAN-C) (JP) (LP-SPA, SES)
KUHLUNGSBORN (KU) (SPA, SEA)
KURE (LORAN-C) (KR) (LF-SPA, SES)
MANILA (MA) (SWF, SPA)
MARCUS (LORAN-C) (MR) (LF-SPA, SES)
MCMATH (MC) (SWF, SCNA)
NANTUCKET (LORAN-C) (NT) (LF-SPA, SES)
NEUSTRELITZ (NU) (SWF, SCNA)
NEW DELHI (ND) (SWF,SCNA, SEA, SES, SFD)
OKINAWA (OK) (SWF)
PANSKA VES (PU) (SWF, SEA, SES)
POITIERS (PO) (SEA)
PORT CLARENCE (LORAN-C) (PC) (LF-SPA, SES)
PRESTON (LO) (SEA)
PYRAMID ROCK (PR) (SPA)
SAN DIEGO (SD) (SPA)
SANDUR (LORAN-C) (SA) (LF-SPA, SES)
SAO PAULO (UM) (SPA, SES)
SITKINAK (LORAN-C) (SK) (LF-SPA, SES)
SOMERTON (SO) (SWF)
SYLT (LORAN-C) (ST) (LF-SPA, SES)
TABLE MOUNTAIN (TM) (SWF, SPA, LF-SPA)
TRINIDAD (TR) (SWF)
UPOLO POINT (LORAN-C) (UP) (LF-SPA, SES)
WHITE SANDS (WS) (SWF)
YAP (LORAN-C) (YP) (LF-SPA, SES)

PERIODS OF NO OBSERVATIONS:

1970 DATE	TIME (UT) and STATION
Nov. 15-30	1715-2400 A22, 1715-2400 A28
19-29	0000-2400 MA
29	0000-2400 AT, 1102-1844 TM
Dec. 01-08	0000-0115 A4
01	0715-0735 UM
02	1210-1250 MA, 1930-2045 UM
03	0000-1656 TM, 0655-0800 UM, 1700-2245 UM, 1704-1710 TM, 1934-2153 TM

SID's by McMATH REGION

Day/Year	60	63	66	71	X-RAY	UNKNOWN	NO FP
Nov. 29, 1970	1						
30	1		3				
Dec. 1, 1970					1		
2		1					
3				1			

COSMIC RAY INDICES
(Neutron Monitors)

November 29 - December 3, 1970

Nov.–Dec. 1970	CHURCHILL	DEEP RIVER	CLIMAX	DALLAS
	DAILY AVERAGE COUNTS PER HOUR	DAILY AVERAGE COUNTS PER HOUR	DAILY AVERAGE COUNTS PER HOUR	DAILY AVERAGE COUNTS PER HOUR
29	5950.5	6474.9	3840.4*	5929.3
30	5963.5	6489.5	-	5944.8
1	5974.1	6524.7	3889.4	5970.9
2	6015.9	6554.6	3919.9	6001.9
3	6052.9	6593.0	3914.0	6011.1

( ) Number of hours for which data are available if less than 24.
* Sum of both sections less than 40 hours.

Churchill Super Neutron Monitor, Scaling Factor 120.

Deep River Neutron Monitor, Scaling Factor 300.

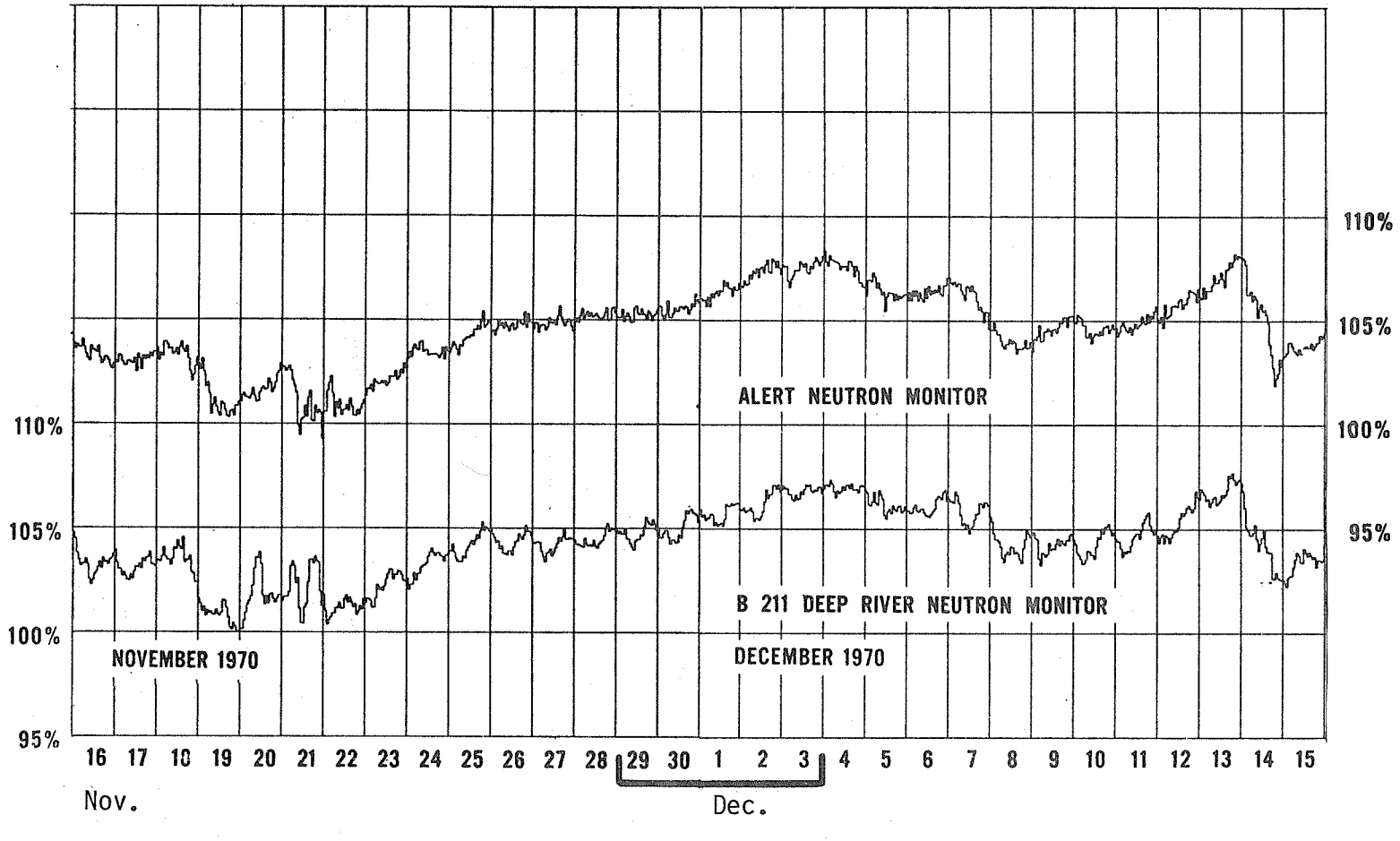
Climax IGC Station B305, Scaling Factor 100. One section normalized by multiplicative factor.

Dallas Super Neutron Monitor, Scaling Factor 120.

COSMIC RAY INDICES

(Pressure Corrected Hourly Totals)

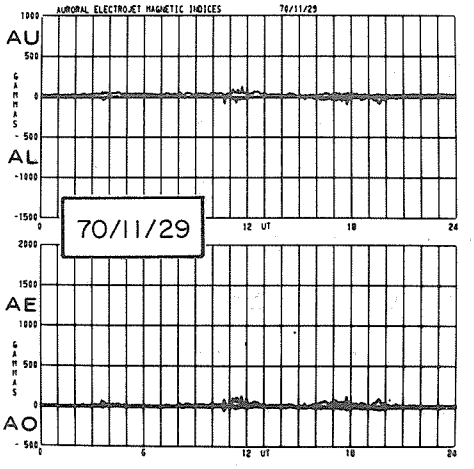
November - December, 1970

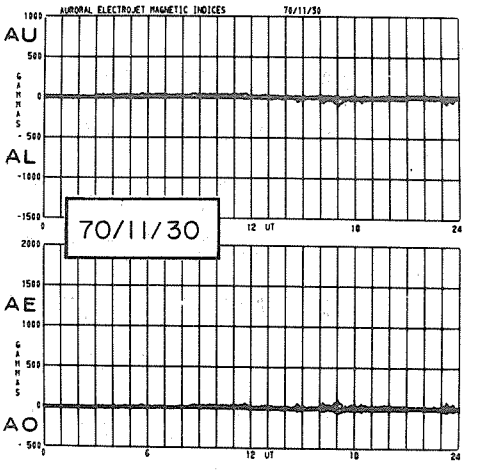


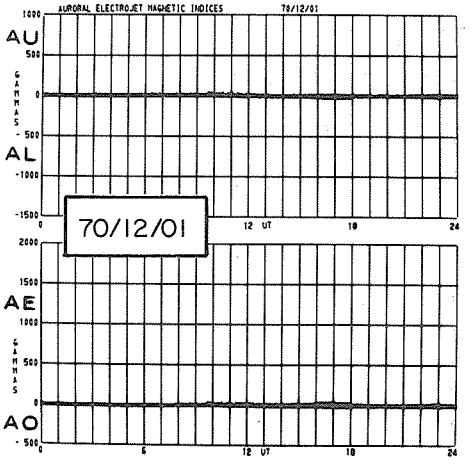
November - December 1970

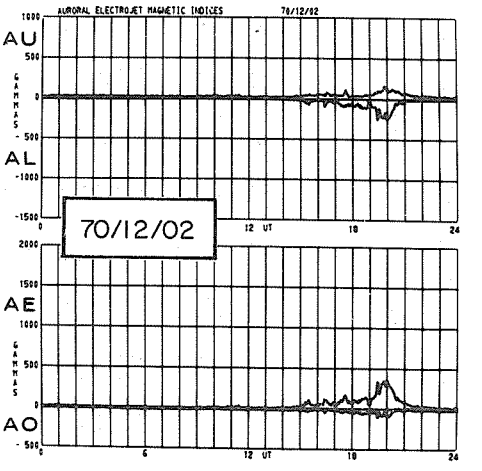
AE INDICES — VALUES ARE EXPRESSED IN GAMMAS

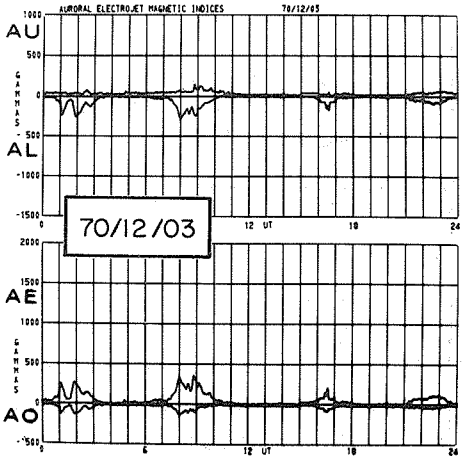
	UT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
D	21	47	87	216	361	177	53	175	319	615	1021	1117	1121	848	931	1057	759	365	316	249	269	250	249	290	187	462
D	22	399	313	365	446	179	98	67	109	263	227	424	358	356	535	577	591	748	589	617	498	482	366	347	345	387
D	23	280	331	314	430	262	316	384	453	558	698	573	497	362	386	1072	1044	785	607	314	342	230	230	414	250	464
	24	105	116	131	128	98	114	50	56	85	53	47	30	36	40	40	117	412	586	446	269	140	139	80	91	142
	25	116	175	193	100	62	61	76	99	117	292	151	152	154	117	167	289	330	477	492	255	137	105	95	138	181
	26	140	113	60	56	74	89	40	36	47	78	125	131	77	46	82	301	329	147	60	166	472	123	98	41	122
	27	38	47	103	72	82	84	78	101	112	387	259	263	374	594	168	59	62	237	264	81	182	212	227	169	177
	28	83	55	59	99	152	313	158	51	49	47	90	97	162	102	273	426	105	36	42	78	52	89	34	41	112
Q	29	27	23	26	48	42	33	29	32	42	38	44	88	54	34	30	29	60	68	44	57	28	22	18	20	39
Q	30	20	17	11	26	33	37	34	30	36	42	41	45	33	30	31	25	57	55	42	42	38	32	28	40	34
Nov. Mean		139	162	155	173	141	150	141	140	195	233	243	266	226	239	272	281	260	226	188	164	167	157	134	129	191
5Q MEAN		23	21	22	27	28	26	25	24	30	40	46	102	62	37	31	31	48	47	39	56	69	39	34	37	39
5D MEAN		246	396	358	448	296	272	335	342	522	645	690	733	481	601	805	629	543	394	311	331	351	295	276	274	441
Q	1	21	17	13	21	16	19	19	20	25	29	31	34	30	28	30	32	47	44	21	16	17	20	25	24	25
	2	27	29	23	24	24	25	16	15	13	25	27	31	25	28	37	75	91	115	129	252	202	66	43	31	57
	3	65	169	163	41	31	41	64	138	272	175	52	25	20	24	23	49	108	48	21	21	23	72	113	74	76
	4	36	26	17	21	17	24	31	67	103	79	41	47	134	143	38	54	43	41	43	63	201	444	315	277	96
	5	237	194	215	189	173	214	169	152	305	371	129	103	115	214	224	330	136	57	36	27	21	22	25	27	154
	6	27	70	101	109	39	64	148	181	340	268	335	163	90	414	502	415	510	375	255	251	187	92	40	38	209
	7	59	43	40	52	103	67	170	125	75	74	135	176	479	339	291	223	171	191	152	289	316	362	335	311	191
D	8	384	438	453	568	414	239	202	434	336	239	536	417	478	691	509	78	58	103	335	388	204	124	163	99	329
	9	90	125	104	83	84	161	115	92	97	59	260	234	69	97	138	115	94	122	64	26	17	20	22	22	96
Q	10	35	24	19	21	29	19	22	19	104	190	106	119	229	299	161	104	115	68	102	184	88	52	23	19	90
Dec. Mean		118	122	128	123	102	117	128	142	174	164	138	121	138	167	142	132	148	123	134	132	123	126	141	131	134
5Q MEAN		49	36	26	35	31	28	36	33	59	85	65	76	83	87	69	56	56	43	52	58	42	37	27	26	50
5D MEAN		280	343	364	325	255	334	333	403	380	311	311	256	322	367	282	229	230	202	351	338	257	216	230	183	296











AU Upper envelope formed by connecting successive extreme high ΔH values

AL Lower envelope formed by connecting successive extreme low ΔH values

AE Auroral Electrojet index = AU - AL

AO Mean value (AU+AL)/2

Daily graphs of 2.5-min Auroral Electroject Magnetic Indices AU, AL, AE and AO for November 29 - December 3, 1970.

Hourly Equatorial Dst Values (Provisional)

November - December 1970

UNIT=GAMMAS

	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	G.M.T. 23	24
Nov.	16	1	2	9	14	15	13	11	10	9	7	8	9	9	11	19	26	24	25	28	24	18	17	14	11
	17	2	-4	1	9	10	14	18	18	20	16	14	12	12	9	10	8	7	8	6	8	11	11	9	8
	18	3	3	8	12	15	11	8	13	17	17	18	15	30	38	23	-8	-7	-1	6	2	1	7	-23	-46
	19	-70	-74	-82	-85	-90	-90	-78	-57	-47	-43	-44	-42	-39	-37	-35	-30	-25	-22	-22	-19	-15	-14	-13	-12
	20	-14	-18	-18	-16	-12	-9	-8	-7	-5	-5	-6	-4	-2	-3	1	3	4	7	9	5	1	1	-2	-4
	21	-5	-6	-9	-18	-16	-14	-12	-17	-15	-24	-35	-54	-75	-67	-76	-90	-80	-67	-61	-59	-53	-45	-44	-42
	22	-44	-44	-29	-32	-38	-41	-40	-40	-38	-40	-38	-36	-40	-43	-44	-46	-44	-42	-39	-43	-45	-46	-46	-49
	23	-52	-50	-48	-47	-46	-46	-49	-46	-45	-38	-44	-42	-32	-28	-35	-38	-42	-40	-34	-33	-35	-30	-38	-38
	24	-36	-35	-36	-32	-34	-17	-9	-6	-7	-11	-10	-8	-6	-5	-5	-9	-15	-14	-15	-16	-13	-10	-14	-10
	25	-6	-7	-6	-5	-6	-6	-5	-5	-6	-2	-0	-3	-8	-7	-4	-5	-6	-7	-2	-2	-3	-2	1	-0
	26	-6	-9	-7	-4	-3	-3	-3	-2	1	2	-0	1	-0	0	1	1	0	-0	4	2	-3	2	5	7
	27	4	1	-1	2	3	1	1	-0	-1	1	0	-1	-4	-6	-6	-1	1	5	5	7	7	1	0	1
	28	-1	-4	-3	-3	-5	-4	-5	-3	1	3	1	1	1	-1	1	1	-1	-1	0	-1	-0	2	5	7
	29	8	5	7	6	6	7	6	5	6	8	7	8	8	8	10	11	9	9	11	12	12	13	15	15
	30	17	15	16	15	12	11	10	9	9	10	10	8	5	6	5	6	5	7	9	10	11	11	11	12
Dec.	1	14	16	16	14	16	16	17	16	17	17	16	17	17	17	16	16	16	17	16	16	16	16	15	15
	2	13	14	19	23	23	22	20	18	19	20	18	18	17	17	22	22	23	28	22	12	17	18	13	11
	3	8	5	11	15	15	16	13	11	11	11	12	13	14	12	15	15	13	12	13	14	12	11	8	4
	4	6	11	11	11	10	12	12	11	11	13	13	15	11	9	13	13	14	20	24	20	14	4	0	-2
	5	-4	-6	-7	-9	-9	-3	-4	-2	-1	1	7	8	10	9	0	-2	-8	-2	1	1	4	6	7	8
	6	5	3	4	4	5	6	4	-4	0	-3	-9	-10	-4	-3	1	-6	-9	-9	-9	-7	-10	-7	-6	-5
	7	-0	5	9	6	-0	1	3	1	0	2	0	-4	-6	-5	1	4	3	7	7	10	5	2	8	-2
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	9	-15	-18	-17	-17	-19	-14	-10	-11	-8	-8	-3	-1	-1	-0	-1	0	2	3	3	4	3	5	5	3
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	11	3	1	-0	-2	-1	1	3	4	6	6	6	7	6	8	11	12	12	11	14	17	17	19	23	23
	12	20	19	17	15	12	11	8	6	7	10	11	9	6	4	2	6	7	8	11	14	15	12	7	5
	13	5	4	3	4	6	7	8	8	10	8	10	12	13	11	12	12	11	11	15	20	19	18	14	7
	14	14	19	39	39	21	-10	-98	-141	-121	-142	-139	-125	-122	-109	-93	-88	-88	-89	-81	-73	-72	-56	-60	-62
	15	-65	-61	-61	-64	-65	-66	-70	-72	-71	-70	-67	-60	-57	-52	-47	-47	-51	-51	-46	-43	-40	-40	-42	-45

GEOMAGNETIC ACTIVITY INDICES

November 29 - December 3, 1970

Nov.-Dec. 1970		K_p THREE-HOUR RANGE INDICES 1	2	3	4	5	6	7	8	SUM	C_i	C_p	A_p
29	QQ	0+	1-	0+	0+	0+	1-	1-	1-	4	0.0	0.0	2
30	QQ	0+	0+	0	0	0+	0	0	1-	2-	0.0	0.0	1
1	QQ	0+	0	0	0	0	0+	0+	0+	1+	0.0	0.0	1
2		1-	0	0	0	2	2	3-	1	8+	0.2	0.1	4
3		2+	1-	2-	1	0+	1-	0	1	8-	0.1	0.1	4

PRINCIPAL MAGNETIC STORMS

DECEMBER 1970

DATE 1970 MO DA	STORM TIME UT START	STORM TIME UT END MO DA. HR	OBS.	GEO-MAG. LAT.	SUDDEN COMMENCEMENT TYPE	AMPLITUDES D(')	AMPLITUDES H(γ)	AMPLITUDES Z(γ)	C FIGURE DEGREE OF ACTIVITY	MAXIMAL ACTIVITY ON K-SCALE 0 TO 9 MO DA	3-HOUR PERIOD	K INDEX	RANGES D (')	RANGES H (γ)	RANGES Z (γ)	STORM NUMBERS
12 04	1054	12 — --	HYDE	7.6N	SC	0	+ 5	- 1	-	— —	-	-	—	--	--	50
12 07	08--	12 08 21	COLL	64.6N	..	..	..	..	MS	12 08	3,4,5	6	162	960	430	51

There were no storms reported on November 29-30, 1970.

SUDDEN COMMENCEMENTS AND SOLAR-FLARE EFFECTS

November 29 - December 7, 1970

Preliminary Report of Sudden Commencements

These reports are provided by Dr. A. Romoña for the International Association of Geomagnetism and Aeronomy Commission IV: Magnetic Activity and Disturbances.

Sc's given by ten or more stations are underlined. Times are mean values obtained from normal magnetograms. When the names of the observatories are not given, the letters in square brackets indicate the quality of the observations.

Sudden commencements followed by a magnetic storm or a period of storminess (s.s.c.)

1970 December 02d 14h 38m: thirty-three (ssc: 21 [A: 2; B: 9; C: 10]; si: 11 [A: 2; B: 8; C: 1]; bs:1).

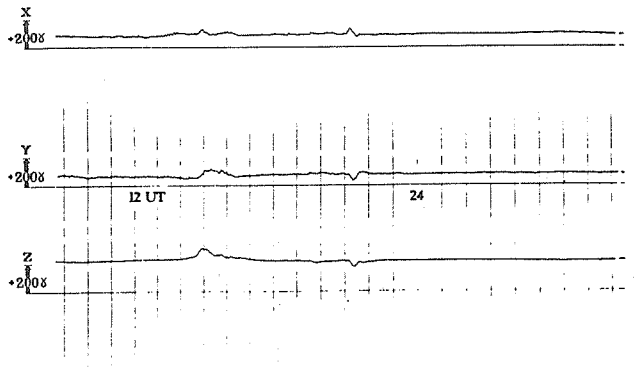
Preliminary report on solar-flare effects (s.f.e.)

Effects confirmed by ionospheric or solar observations are underlined.

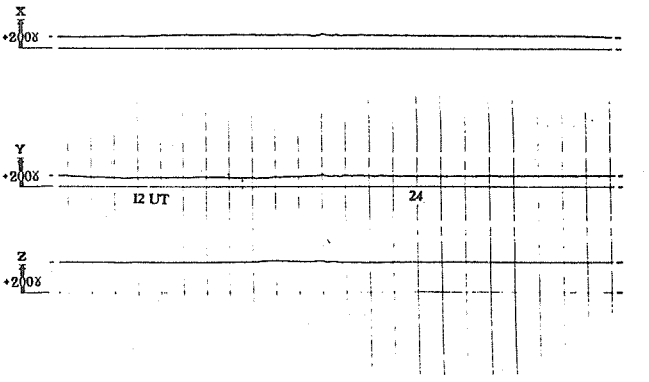
1970 December 04d 16h 42m - 16h 50m: HU.
07d 00h 20m - 01h 00m: SS.
07d 17h 52m - 18h 06m: HU.

KIRUNA, NORMAL MAGNETOGRAM

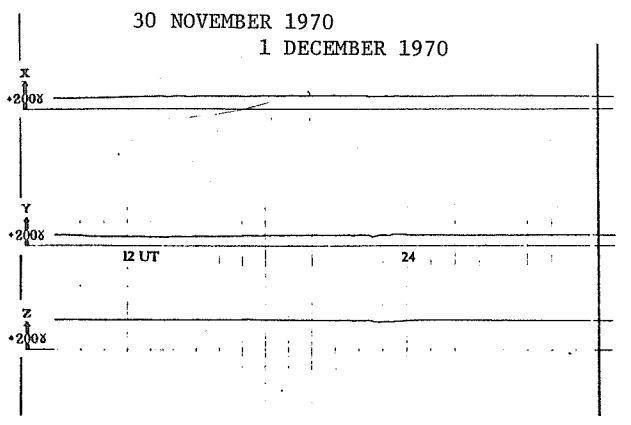
28-29 NOVEMBER 1970



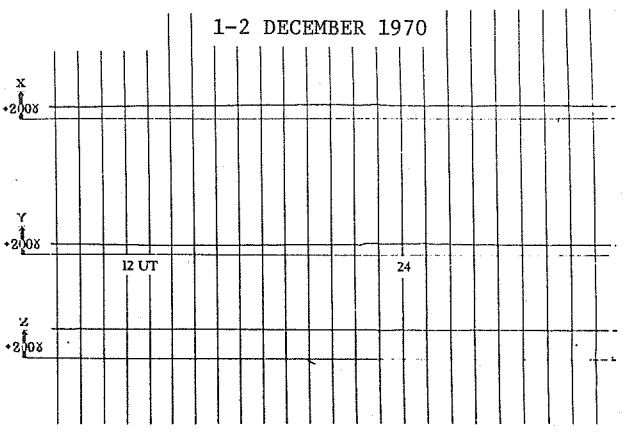
29-30 NOVEMBER 1970



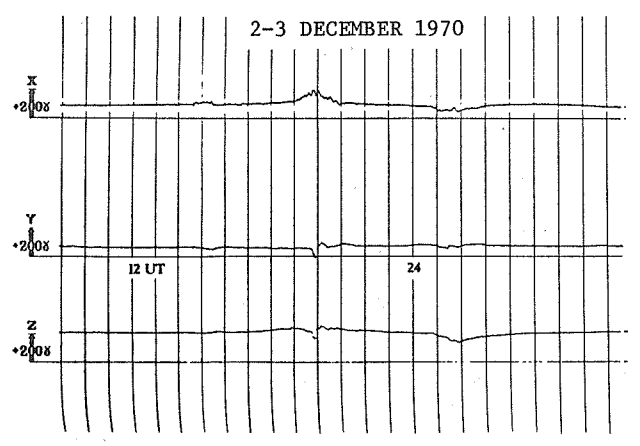
30 NOVEMBER 1970
1 DECEMBER 1970



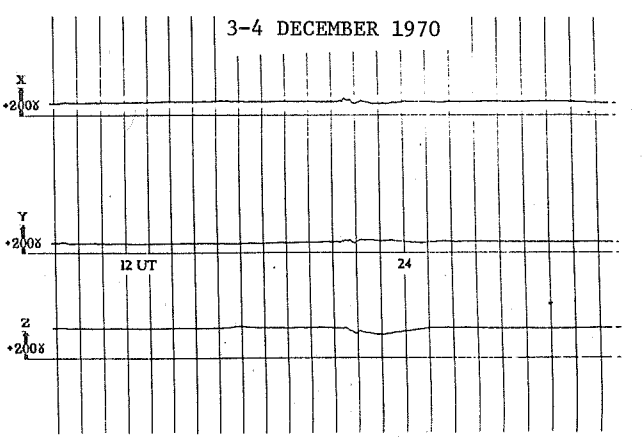
1-2 DECEMBER 1970



2-3 DECEMBER 1970



3-4 DECEMBER 1970



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